

22 JUN 05

Sheet 1 of 1

List of Implemented CR(s):

ISS_EVA_SYSU323 ISS_EVA_SYSU324 ISS_EVA_SYSU325 ISS_EVA_SYSU326

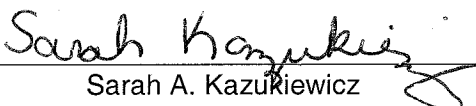
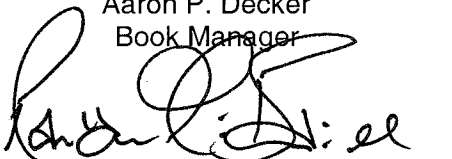
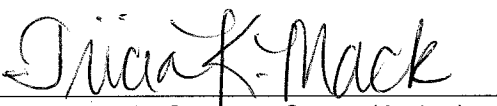
Uplinked Messages (or Approved Flight Notes) replaced by this PCN, remove from Book:

None

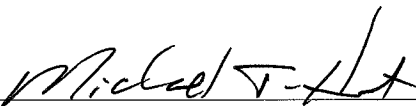
Incorporates the following:

1. Replace cover
2. Replace iii thru x
3. Replace 17 thru 68, 71 thru 78, 85 thru 88, 103 and 104, 169 thru 176, 185 thru 188, 195 thru 198, 211 thru 214, 277 and 278, 283 thru 288, 293 and 294, 299 thru 304, 307 thru 320, 323 thru 336, 355 thru 370, 459 thru 464, 471 thru 482, 493 thru 554, 557 thru 590, 597 thru 616

APPROVED BY:

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ACCEPTED BY:

Michael T. Hurt
SODF Manager**File this PCN immediately behind the front cover as a permanent record**



JSC-48538
Starting with E11

International Space Station ISS EVA Systems Checklist

**Mission Operations Directorate
Operations Division**

22 JUN 05

*These procedures are available
electronically on the SODF Homepage
at <http://mod.jsc.nasa.gov/do3>*

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



PST CODE: EVA SYS LF1 FIN 2

INTERNATIONAL SPACE STATION ISS EVA SYSTEMS CHECKLIST

LIST OF EFFECTIVE PAGES

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22 JUN 05

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9	12 APR 05	52	16 MAY 05
10	12 APR 05	53	16 MAY 05
11	12 APR 05	54	16 MAY 05
12	12 APR 05	55	16 MAY 05
13	12 APR 05	56	16 MAY 05
14	12 APR 05	57	16 MAY 05
15	26 APR 05	58	16 MAY 05
16	26 APR 05	59	16 MAY 05
17	16 MAY 05	60	16 MAY 05
18	16 MAY 05	61	16 MAY 05
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20	08 JUN 05	63	16 MAY 05
21	08 JUN 05	64	16 MAY 05
22	08 JUN 05	65	16 MAY 05
23	08 JUN 05	66	16 MAY 05
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* - Omit from flight book

73.....	08 JUN 05	123	19 APR 05
74.....	08 JUN 05	124	19 APR 05
75.....	08 JUN 05	125	19 APR 05
76.....	08 JUN 05	126	19 APR 05
77.....	16 MAY 05	127	19 APR 05
78.....	16 MAY 05	128	19 APR 05
79.....	26 APR 04	129	19 APR 05
80.....	26 APR 05	130	19 APR 05
81.....	28 APR 04	131	19 APR 05
82.....	28 APR 04	132	19 APR 05
83.....	29 JUN 04	133	19 APR 05
84.....	29 JUN 04	134	19 APR 05
85.....	16 MAY 05	135	19 APR 05
86.....	16 MAY 05	136	19 APR 05
87.....	16 MAY 05	137	19 APR 05
88.....	16 MAY 05	138	19 APR 05
89.....	03 JUN 04	139	12 MAR 04
90.....	03 JUN 04	140	26 APR 05
91.....	03 JUN 04	141	19 APR 05
92.....	03 JUN 04	142	19 APR 05
93.....	27 APR 04	143	19 APR 05
94.....	27 APR 04	144	19 APR 05
95.....	26 APR 05	145	19 APR 05
96.....	26 APR 05	146	19 APR 05
97.....	09 MAR 05	147	19 APR 05
98.....	09 MAR 05	148	19 APR 05
99.....	09 MAR 05	149	19 APR 05
100.....	09 MAR 05	150	26 APR 05
101.....	09 MAR 05	151	08 JUN 04
102.....	26 APR 05	152	26 APR 05
103.....	19 MAY 05	153	23 JUN 04
104.....	19 MAY 05	154	23 JUN 04
105.....	19 APR 05	155	23 JUN 04
106.....	19 APR 05	156	23 JUN 04
107.....	19 APR 05	157	23 JUN 04
108.....	19 APR 05	158	23 JUN 04
109.....	19 APR 05	159	23 JUN 04
110.....	19 APR 05	160	23 JUN 04
111.....	19 APR 05	161	19 APR 05
112.....	19 APR 05	162	19 APR 05
113.....	11 JUN 04	163	19 APR 05
114.....	26 APR 05	164	19 APR 05
115.....	19 APR 05	165	30 MAR 05
116.....	19 APR 05	166	30 MAR 05
117.....	19 APR 05	167	26 APR 05
118.....	19 APR 05	168	26 APR 05
119.....	19 APR 05	169	16 MAY 05
120.....	19 APR 05	170	16 MAY 05
121.....	19 APR 05	171	16 MAY 05
122.....	19 APR 05	172	16 MAY 05

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173.....	16 MAY 05	223	19 APR 05
174.....	16 MAY 05	224	19 APR 05
175.....	16 MAY 05	225	19 APR 05
176.....	22 JUN 05	226	26 APR 05
177.....	18 APR 05	227	11 JUN 04
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213.....	19 MAY 05	263	19 APR 05
214.....	19 MAY 05	264	19 APR 05
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217.....	19 APR 05	267	14 MAR 05
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219.....	19 APR 05	269	14 MAR 05
220.....	26 APR 05	270	14 MAR 05
221.....	19 APR 05	271	14 MAR 05
222.....	19 APR 05	272	14 MAR 05

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273.....	14 MAR 05	323	13 JUN 05
274.....	26 APR 05	324	13 JUN 05
275.....	26 APR 05	325	13 JUN 05
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284.....	16 MAY 05	334	13 JUN 05
285.....	13 JUN 05	335	13 JUN 05
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287.....	13 JUN 05	337	30 AUG 02
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290.....	26 APR 05	340	26 APR 05
291.....	22 APR 04	341	26 APR 05
292.....	26 APR 05	342	26 APR 05
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294.....	22 JUN 05	344	25 APR 05
295.....	22 APR 04	345	25 APR 05
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299.....	16 MAY 05	349	08 APR 05
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301.....	16 MAY 05	351	13 APR 05
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303.....	16 MAY 05	353	13 APR 05
304.....	16 MAY 05	354	26 APR 05
305.....	09 JUN 04	355	13 JUN 05
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321.....	04 JUN 04	371	26 APR 05
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373.....	31 MAR 05	423	31 MAR 05
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375.....	31 MAR 05	425	31 MAR 05
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379.....	31 MAR 05	429	14 APR 05
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393.....	18 APR 05	443	31 MAR 05
394.....	18 APR 05	444	26 APR 05
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396.....	18 APR 05	446	26 APR 05
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400.....	18 APR 05	450	08 APR 05
401.....	18 APR 05	451	08 APR 05
402.....	18 APR 05	452	08 APR 05
403.....	18 APR 05	453	08 APR 05
404.....	18 APR 05	454	08 APR 05
405.....	24 MAR 05	455	08 APR 05
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407.....	12 APR 05	457	08 APR 05
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413.....	31 MAR 05	463	12 MAY 05
414.....	31 MAR 05	464	12 MAY 05
415.....	31 MAR 05	465	08 APR 05
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417.....	31 MAR 05	467	08 APR 05
418.....	26 APR 05	468	08 APR 05
419.....	31 MAR 05	469	08 APR 05
420.....	31 MAR 05	470	08 APR 05
421.....	31 MAR 05	471	13 JUN 05
422.....	31 MAR 05	472	13 JUN 05

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473.....	13 JUN 05	523	16 MAY 05
474.....	13 JUN 05	524	22 JUN 05
475.....	13 JUN 05	525	16 MAY 05
476.....	22 JUN 05	526	22 JUN 05
477.....	13 JUN 05	527	16 MAY 05
478.....	13 JUN 05	528	22 JUN 05
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485.....	08 APR 05	535	16 MAY 05
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506.....	22 JUN 05	556	26 APR 05
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513.....	16 MAY 05	563	13 JUN 05
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515.....	16 MAY 05	565	13 JUN 05
516.....	22 JUN 05	566	13 JUN 05
517.....	16 MAY 05	567	13 JUN 05
518.....	22 JUN 05	568	13 JUN 05
519.....	16 MAY 05	569	13 JUN 05
520.....	22 JUN 05	570	13 JUN 05
521.....	16 MAY 05	571	13 JUN 05
522.....	22 JUN 05	572	13 JUN 05

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573.....	13 JUN 05	623	21 APR 05
574.....	22 JUN 05	624	26 APR 05
575.....	16 MAY 05	625	24 MAR 05
576.....	16 MAY 05	626	26 APR 05
577.....	16 MAY 05		
578.....	16 MAY 05		
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580.....	22 JUN 05		
581.....	13 JUN 05		
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611.....	13 JUN 05		
612.....	13 JUN 05		
613.....	13 JUN 05		
614.....	13 JUN 05		
615.....	13 JUN 05		
616.....	13 JUN 05		
617.....	26 APR 05		
618.....	26 APR 05		
619.....	21 APR 05		
620.....	21 APR 05		
621.....	21 APR 05		
622.....	21 APR 05		

* - Omit from flight book

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(10 Minutes for PHA Setup)
(5 Minutes for LEH Configuration)

OBJECTIVE:

This procedure will allow the EVA crewmembers to perform their 80-minute mask prebreathe using shuttle O₂. Shuttle LEH O₂ is used for the exercise portion, while shuttle O₂ from the E-Lk PBA ports is used for nonexercise periods. PHA SETUP steps may be performed the night before an EVA. LEH CONFIGURATION steps must be performed immediately prior to EVA PREP.

PHA SETUP

- C-Lk 1. Unstow PHA bags (two 60-ft Bags, one 90-ft Bag).
- E-Lk 2. Verify all three PHA Bags configured per Figure 1, connect all components.



Figure 1.- PHA Bag Configuration.

1.205 SHUTTLE LEH CONFIGURATION FOR EVA PREBREATHE ON ISS

(ISS EVA SYS/UF2 - ALL/FIN 2/Paper on ISS)

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3. Temporarily store both 60-ft PHA bags in E-Lk near A/L PBA port.
4. Transfer 90-ft PHA Bag to orbiter middeck.
Temporarily stow Bag.

LEH CONFIGURATION

5. ✓ **MCC-H** to ensure O2 cryo config will support EVA Prebreathe

L2 6. ✓ O2 XOVR SYS 1,2 – OP

MO32M 7. Relief Valve of 90-ft PHA Bag →|← LEH O2 5

8. LEH O2 5 vlv → OP

9. Route 90-ft PHA from orbiter middeck to CEVIS.
Use Velcro ties to tend hose, as required.

Lab 10. Secure loose end of 90-ft hose to CEVIS using Velcro ties.

1.210 EVA PREP USING SHUTTLE O2

(ISS EVA SYS/UF2 - ALL/FIN 5/SPN/HC/Paper on ISS)

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(170 Minutes)

OBJECTIVE:

Prepare for EVA using exercise prebreathe protocol. During exercise, a 90-foot PHA hose is plumbed into a middeck LEH port. Shuttle oxygen is utilized for the entire prebreathe.

1. EVA COMM AND AIRLOCK ENVIRONMENT CONFIG

- MCC-H/IV**
- 1.1 Perform {2.701 UHF 1 ORU ACTIVATION}, all (SODF: C&T: NOMINAL: UHF), then:
 - 1.2 Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION FOR UHF OPS}, steps 1 to 11 (SODF: C&T: NOMINAL: AUDIO), then:
 - 1.3 Prior to beginning step 7, perform {1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION}, steps 1 to 7 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:
- IV**
- 1.4 Perform shuttle EVA COMM CONFIG, all (FDF: EVA: EVA PREP), then:

EXERCISE PREBREATHE/PREP FOR DONNING (110 MINUTES)

2. VERIFYING AIRLOCK EQUIPMENT

- 2.1 √PFE located in PFE locker
√Pressure gauge needle is in green zone (800 to 900 psig)
 - 2.2 √Three PHA Quick Don Masks available to support EVA Prep
 - 2.3 √PBA Bottles and Quick Don Masks located in Airlock for every isolated crewmember
√PBA Bottles →|← Quick Don Masks for each non-EVA crewmember in Airlock
√Oxygen Bottle pressure gauge needle ≥ 3000 psig for each Bottle
 - 2.4 √Two CSA-CPs located in Airlock
√Battery power for both CSA-CPs
- AL10A1**
- 2.5 √Flexible Vent Duct attached to the Conditioned Air Supply connection
 - 2.6 Set up and activate one PCS in Airlock.

√SSC located in Airlock

3. ACTIVATING AIRLOCK CO2 REMOVAL

- 3.1 Unstow new Metox Canisters (two).
Report barcodes to **MCC-H**.

1.210 EVA PREP USING SHUTTLE O2

(ISS EVA SYS/UF2 - ALL/FIN 5/SPN/HC/Paper on ISS)

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- 3.2 Remove Metox Canister caps.
Stow in EMU Equipment Bag.

A/L1A1

- 3.3 Open CO2 Removal Receptacle door.

3.4 √CO2 VALVE – REMOVAL

- 3.5 Install Metox Canisters in CO2 Removal Receptacle per label on closeout.

- 3.6 Close and latch CO2 Removal Receptacle door.

4. MASK PREBREATHE PREP

EV1,2

- 4.1 Relief Valve of 60-ft PHA Bags 1,2 →|← A/L PBA port
Route one 60-ft hose from PBA port to CEVIS (secure bag to handrail).

- 4.2 Position Heart Rate Watch on CEVIS.
Install EV1 PCMCIA card in CEVIS.

- 4.3 Verify prime and backup bungees are configured (blue or black only).

ISS IV

- 4.4 Perform {2.2.050 CEVIS - ON LINE MODE OPERATIONS}, step 3 (SODF: MED OPS: NOMINAL: CMS), then:

EV1,2

- 4.5 Don Ergometer/CEVIS shoes.
Don other over-the-head garments.
Don TCU top.

- 4.6 Take one aspirin tablet (325 mg).

5. CONFIGURING FOR PHA COMMUNICATION (IF REQUIRED)

- 5.1 EACP Y-Cable ←|→ ATU 4,5

- 5.2 PHA Comm Cables →|← Headset Control Unit (HCU)

√HCU →|← HCU Extension Cable

- 5.3 HCU Extension Cable →|← ATU (near activity)

- 5.4 HCU → PTT (to alleviate noise)

ATU

- 5.5 pb PTT → Press
pb 1 → Press (Big Loop)
pb 5 → Press (Airlock)

1.210 EVA PREP USING SHUTTLE O2

(ISS EVA SYS/UF2 - ALL/FIN 5/SPN/HC/Paper on ISS)

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- √Display – '1G, 5T' and other loops, as required
- √Display – 'PTT'

INITIATING MASK PREBREATHE

WARNING

Positive mask O2 pressure and fit are necessary to ensure adequate prebreathe.

EV1,2 6. Verify black plates in top of Quick Don Mask are seated in silicon.

7. Don Quick Don Mask.

PHA 8. Quick Don Mask O2 control → EMERGENCY

9. Momentarily pull Mask away from face.

√O2 flow

IV Record mask prebreathe initiation GMT in block A on EVA
PREBREATHE CUE CARD, start timer, **P/B PET = 0:00**

EV 10. √Comm, as required

NOTE

Steps 11 to 13 should be performed in parallel.

EV-1,IV 11. Perform exercise per EVA EXERCISE PRESCRIPTION
steps 1 to 14 on EVA PREBREATHE CUE CARD.

EV-2 12. EMU POWERUP (BOTH EMUs)

UIA 12.1 √sw UIA PWR EV-1,2 (two) – OFF
√UIA PWR EV-1,2 LEDs (four) – Off
√EMU O2 SUPPLY PRESS gauge: 850 to 950

C-Lk wall 12.2 Remove SCU from stowage straps and pouches.
Transfer SCU to E-Lk.

DCM 12.3 Open DCM Cover.
Affix cover to DCM with Velcro.

12.4 SCU →|← DCM

√SCU locked

EV2 DCM 12.5 sw POWER → BATT

1.210 EVA PREP USING SHUTTLE O2

(ISS EVA SYS/UF2 - ALL/FIN 5/SPN/HC/Paper on ISS)

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CAUTION

EMU must be on BATT power when UIA suit power is turned on.

PSA 12.6 √sw SUIT SELECT (two) – OFF
√sw EMU MODE EMU1,2 (two) – PWR

12.7 sw MAIN POWER → ON

√MAIN POWER LED – On

12.8 sw SUIT SELECT (two) → EMU 1,2

√EMU 1,2 LEDs (two) – On

√EMU 1,2 Volts: 18.0 to 19.0

UIA 12.9 sw PWR EV-1,2 (two) → ON

√PWR EV-1,2 EMU LEDs (two) – On

DCM 12.10 sw POWER → SCU

12.11 √STATUS: BATT VDC ≥ 20.3

UIA 13. OXYGEN EMU 1,2 vlv (two) → OPEN

NOTE

Steps 14 to 18 should be performed in parallel.

When EV1 Exercise complete

EV2,IV

14. Perform exercise per EVA EXERCISE PRESCRIPTION steps 1 to 14 on EVA PREBREATHE CUE CARD.

EV1 Both
EMUs

15. Waist ring ←|→ HUT

Temporarily stow LTA.

16. Helmet ←|→ HUT

Temporarily stow helmet.

17. Gloves ←|→ EMU

Temporarily stow gloves.

18. Remove Dosimeter from in-flight garments.
Insert Dosimeter in LCVG left leg pocket.

1.210 EVA PREP USING SHUTTLE O2

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IV	EV1/EV2
<p>19. On the shuttle middeck MO32M Relief Valve of 90-ft PHA ← → LEH O2 5 Port</p> <p>20. LEH O2 5 vlv → CL</p> <p>23. Stow hose in 90-ft PHA Bag.</p> <p>24. Stow the following in E-Lk 90-ft PHA Bag EVA PREBREATHE CUE CARD Food and drink for EV crew, if desired.</p>	<p>21. If necessary, apply Medical Kit items. Refer to {5.110 APPROVED NON-EMU HARDWARE}, all (SODF: ISS EVA SYS: REFERENCE), as required.</p> <p>22. Don MAG, TCU bottom, LCVG, biomed.</p> <div> </div> <p>Figure 1.- Nondisposable Biomed Configuration.</p>

IV

25. CLOSING NODE 1 STBD HATCH

NOTE

Be prepared to initiate depress within 5 minutes of closing the Node 1 Stbd Hatch to prevent high O2 concentrations in the Airlock.

When P/B PET = 50 minutes and 15 minutes post second EV crew exercise

25.1 √**MCC-H** for Go to continue

25.2 √Node 1 Stbd Hatch MPEV – CLOSED and uncapped

25.3 Check hatch seal and close Node 1 Stbd Hatch per decal (omit last step of decal).

WARNING

Do not initiate depress until 50 minutes of mask prebreathe and 15 minutes post second EV crew exercise are complete. The depress time from 760 mmHg (14.7 psia) to 527 mmHg (10.2 psia) must be greater than 20 minutes.

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26. DEPRESSING TO 10.2 PSIA

EV1,2

26.1 Momentarily pull Mask away from face to verify positive O2 flow

* If no positive O2 flow, contact **MCC-H**.

NOTE

1. EV crew should perform steps 26.2 to 26.8 while IV is depressing Airlock to 10.2 psia (527 mmHg) in steps 26.9 to 26.23
2. EMU displays **O2 IS OFF** message during Airlock depress, sw DISP → PRO, as required.

DCM

26.2 ✓STATUS: **SOP P**: > 5410 (compare with gauge)

26.3 ✓Waist ring – open

26.4 Don LTA (attach donning handles as required).

If boot bladder manipulation required

26.5 Boot ←|→ Leg (sizing ring)

26.6 Pull up excess boot bladder around full circumference of boot disconnect.

WARNING

Keep bladder material clear of threads during reconnection of boot.

26.7 Boot →|← Leg (sizing ring)

26.8 Lock 1 → LOCK

✓All locks (three per boot) are engaged

IV UIA

26.9 ✓DEPRESS PUMP ENABLE LED – On

UIA

26.10 sw DEPRESS PUMP PWR → ON

Wait 10 seconds.

C-Lk

26.11 DEPRESS PUMP MAN ISOV → OPEN

✓Cab Press – Decreasing (use Vacuum Manometer or PCS)

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PCS

Airlock: ECLSS

Airlock: ECLSS

'Equipment Lock'

- 26.12 Start depress PET clock.
Record start time in Block C of Prebreathe Cue Card.

When Cab Press < 14.1 psia (729 mmHg)

- 26.13 Turn Hatch handle in the UNLATCH direction approximately 1.5 turns to place the Hatch in the equalize position (orange stripe).

- 26.14 Crank Handle – Stowed position

NOTE

1. CSA-CP % O2 will read approximately 1 % lower than actual during depress. Stable Airlock pressure is needed to obtain an accurate reading.
2. Per SPN 2563 (12A to 20A), each MCA partial pressure reading of the Airlock will be 86 seconds old before the depress begins, and will increase up to 99 seconds old at 10.2 psia.

- 26.15 Monitor O2 using CSA-CP during depress.
Refer to Figure 2.

C-Lk

When Airlock is at 11.8 (610 mmHg)

- 26.16 DEPRESS PUMP MAN ISOV → CLOSED

- 26.17 Wait for depress PET = 15 minutes and O2 > 24.5 %

- 26.18 ✓ **MCC-H** for Go to continue

- 26.19 DEPRESS PUMP MAN ISOV → OPEN

- 26.20 Continue DEPRESS to 10.2 psia (527 mmHg).
Refer to Figure 2.

- 26.21 DEPRESS PUMP MAN ISOV → CLOSED

- 26.22 Verify O2 is between 23.5 and 28.8 %.

UIA

- 26.23 sw DEPRESS PUMP PWR → OFF

MCC-H/IV

- 26.24 Perform {1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION}, step 8 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:

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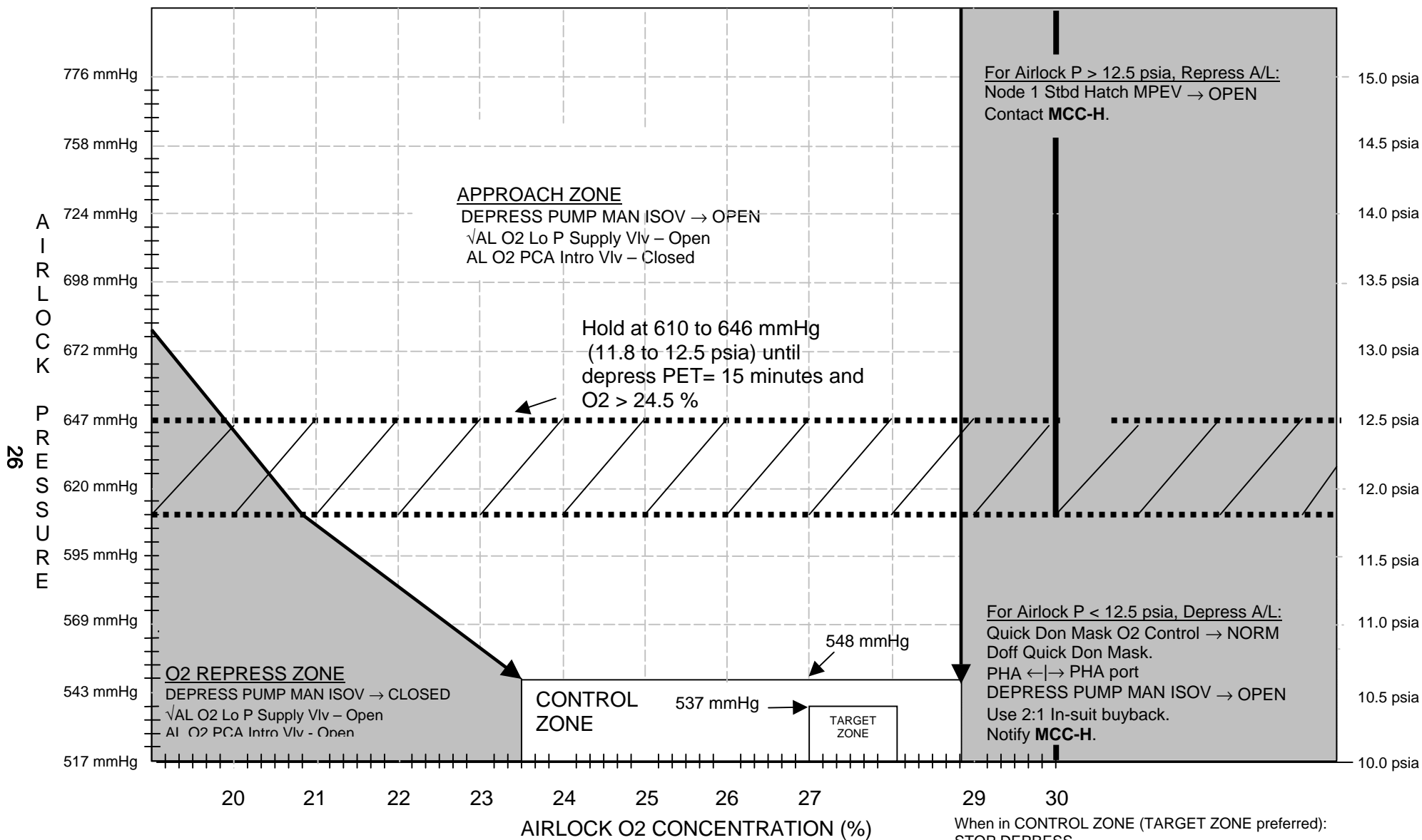


Figure 2.- 10.2 Airlock Depress Graph.

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WARNING

Do not terminate mask prebreathe until:

- Airlock at 10.2 psia (527 mmHg)
- P/B PET > 1:20
- 0:45 since finishing EV2 exercise
- Airlock O2 between 23.5 and 28.8 %

When mask prebreathe complete

- ☐☐☐☐ 27. Momentarily pull Mask away from face to verify positive O2 flow.

* If no positive O2 flow, contact **MCC-H**.

- PHA ☐☐☐☐ 28. Quick Don Mask O2 control → NORMAL

Record Mask Prebreathe Terminate P/B PET in block D on EVA PREBREATHE CUE CARD.

- ☐☐☐☐ 29. Doff Quick Don Mask.

- A/L1D2 ☐☐☐☐ 30. Relief Valve of 60-ft PHA ←|→ A/L PBA port
Install cap on A/L PBA port.
Close A/L PBA door.

- ☐☐☐☐ 31. Unstow biomed pigtail from EMU Servicing Kit.

Biomed pigtail →|← signal conditioner
Biomed pigtail →|← electrical harness

- ☐☐☐☐ 32. Don comm cap.

NOTE

Due to an RF interference issue between the hand-held mics and the EMU radios, the hand-held mic should not be used in the vicinity of powered EMU radios.

- DCM ☐☐☐☐ 33. sw COMM mode → PRI (hot mic to **MCC-H**)

- ☐☐☐☐ 34. √sw Comm FREQ – LOW

- ☐☐☐☐ 35. Verify biomed, EMU data, RF comm with **MCC-H**.

- ☐☐☐☐ 36. sw COMM mode → HL

- ☐☐☐☐ 37. Doff comm cap.

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- ☐☐☐☐ 38. Biomed pigtail ←|→ electrical harness
- ATU4,5 ☐☐☐☐ 39. √EACP Y-Cable →|← ATUs
- EACP ☐☐☐☐ 40. √EACP Y-Cable →|← EACP
- sw PWR → ON
- √EMU1,2 mode sel (two) – DUAL
- ATU4,5,6 ☐☐☐☐ 41. pb PTT → Press
pb 1 → Press (Big Loop)
pb 3 → Press (Shuttle/ISS ICOM)
pb 5 → Press (Airlock)
- √Display – '1G, 3, 5T' other comm. loops as required
√Display – '**DUAL**'

EMU DONNING (55 MINUTES)

NOTE

May be performed by EV1 and EV2 simultaneously.

- ☐☐☐☐ 42. √EDDA latched
- ☐☐☐☐ 43. If not taken previously, take one aspirin tablet (325 mg).
- ☐☐☐☐ 44. √Suit arms aligned
- ☐☐☐☐ 45. √Gloves ←|→ EMU
√Wrist disconnects – op
- ☐☐☐☐ 46. Stow IV glasses as required.
- ☐☐☐☐ 47. Don thumb loops.
- ☐☐☐☐ 48. √Drink vlv position
- ☐☐☐☐ 49. √Biomed connector is outside of HUT
- ☐☐☐☐ 50. Don HUT.
- ☐☐☐☐ 51. Release thumb loops.
- ☐☐☐☐ 52. √Suit arms aligned
- ☐☐☐☐ 53. Don EV glasses as required.
Don comm cap.
- ☐☐☐☐ 54. √Comm

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☐☐☐☐ 55. Biomed pigtail →|← electrical harness

☐☐☐☐ 56. LCVG →|← Multiple Water Connector

√Multiple Water Connector locked

☐☐☐☐ 57. √Thermal cover clear of waist ring

☐☐☐☐ 58. Waist ring → engage position

☐☐☐☐ 59. Waist ring →|← HUT

√Waist ring locked

☐☐☐☐ 60. Remove donning handles.
Stow donning handles in EMU Equipment Bag.

☐☐☐☐ 61. Cover waist ring.

CAUTION

Pulling on blue bite valve to adjust position
can cause valve to release from stem.

☐☐☐☐ 62. √Drink vlv position

☐☐☐☐ 63. √Mic boom position

☐☐☐☐ 64. Don comfort gloves, wristlets.

☐☐☐☐ 65. Wrist rings → engage position

☐☐☐☐ 66. Don EV gloves.

√EV gloves locked

☐☐☐☐ 67. Tighten palm restraint straps.

☐☐☐☐ 68. √sw Glove heater (two) – OFF

☐☐☐☐ 69. √sw REBA – OFF (pull tab toward left arm of suit)

☐☐☐☐ 70. Lower arm power harness cables →|← Gloves

Stow slack under arm TMG.

☐☐☐☐ 71. √Cuff C/L position
√Wrist mirrors installed

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CAUTION

Flexible Ventilation Duct must be removed from Crewlock prior to taking EMU Fan to ON to avoid ice formation on UIA water lines.

- ☐☐☐☐ 72. Rotate Flexible Ventilation Duct out of C-Lk.

CAUTION

Minimize fan operation with O2 ACT – OFF (~2 minutes).

- DCM ☐☐☐☐ 73. sw FAN → ON

- ☐☐☐☐ 74. √Electrical harness clear of neck ring

- ☐☐☐☐ 75. Don helmet.

√Helmet locked

- DCM ☐☐☐☐ 76. O2 ACT → IV

- ☐☐☐☐ 77. √Helmet purge vlv – cl, locked

- DCM ☐☐☐☐ 78. PURGE vlv → cl (dn)

If EMU TV capability

- ☐☐☐☐ 79. Unstow EMU TV power cable.

- ☐☐☐☐ 80. EMU TV power cable ←|→ Ground plug

- ☐☐☐☐ 81. EMU TV power cable →|← EMU TV

- EV2 ☐☐☐☐ 82. Repeat steps 42 to 81 if donning performed serially.

EMU CHECK (5 MINUTES)

- Both ☐☐☐☐ 83. √Cooling

* If cooling insufficient

* | Slowly cycle Temp control vlv between 7 and Max C
* | while IV depresses and holds pump priming valve
* | on back of EMU (30 seconds minimum).

- DCM ☐☐☐☐ 84. Temp control vlv → as required

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- | | | | |
|---|-----|-------------------|--------------------------------|
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | 85. | √Wrist rings | – covered |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √Waist rings | – covered |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √sw WATER | – OFF (switch guard installed) |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √sw POWER | – SCU |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √sw FAN | – ON |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √sw Comm FREQ | – LOW |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √Helmet lights | – Operational |
| <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √Helmet purge vlv | – cl, locked |
| DCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> | | √PURGE vlv | – cl (dn) |

NOTE

During leak check, when **SET O2 IV** message is displayed, wait 30 seconds and √SUIT P gauge stable (4.2 to 4.4) before moving O2 ACT → IV.

- ☐☐☐☐ 86. sw DISP → STATUS until **LEAK CHECK?** displayed
sw DISP → YES

Follow displayed instructions.

```
*****
* If LEAKAGE HI SUIT P X.X
*   Perform {2.115 FAILED LEAK CHECK (14.7/10.2
*   PSIA)}, all (SODF: ISS EVA SYS: EMU
*   CONTINGENCY), then:
*****
```

87. Go to {1.220 EMU PURGE}, all (SODF: ISS EVA SYS: EVA PREP/POST).

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1.215 EVA PREP USING ISS O2

(ISS EVA SYS/7A - ALL/FIN 6/SPN/HC/Paper on ISS)

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(170 Minutes)

OBJECTIVE:

Prepare for EVA using exercise prebreathe protocol. All of the oxygen required to support prebreathe is supplied from ISS high pressure oxygen tank.

1. EVA COMM AND AIRLOCK ENVIRONMENT CONFIG

MCC-H/IV

1.1 Perform {2.701 UHF 1 ORU ACTIVATION}, all (SODF: C&T: NOMINAL: UHF), then:

1.2 Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION FOR UHF OPS}, steps 1 to 11 (SODF: C&T: NOMINAL: AUDIO).

1.3 Prior to beginning step 7, perform {1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION}, steps 1 to 7 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:

If orbiter docked

IV

1.4 Perform shuttle EVA COMM CONFIG, all (FDF: EVA: EVA PREP), then:

EXERCISE PREBREATHE/PREP FOR DONNING (110 MINUTES)

IV

2. VERIFYING AIRLOCK EQUIPMENT

2.1 ✓PFE located in PFE locker

✓Pressure gauge needle is in green zone (800 to 900 psig)

2.2 ✓Three PHA Quick Don Masks available to support EVA Prep

2.3 ✓PBA Bottles and Quick Don Masks located in Airlock for every isolated crewmember

✓PBA Bottles →|← Quick Don Masks for each non-EVA crewmember in Airlock

✓Oxygen Bottle pressure gauge needle ≥ 3000 psig for each Bottle

2.4 ✓Two CSA-CPs located in Airlock

✓Battery power for both CSA-CPs

AL10A1

2.5 ✓Flexible Vent Duct attached to the Conditioned Air Supply connection

2.6 Set up and activate one PCS in Airlock.

✓SSC located in Airlock

3. ACTIVATING AIRLOCK CO2 REMOVAL

3.1 Unstow new Metox Canisters (two).
Report barcodes to **MCC-H**.

3.2 Remove Metox Canister caps.
Stow in EMU Equipment Bag.

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A/L1A1 3.3 Open CO2 Removal Receptacle door.

3.4 ✓ CO2 VALVE – REMOVAL

3.5 Install Metox Canisters in CO2 Removal Receptacle per label on closeout.

3.6 Close and latch CO2 Removal Receptacle door.

4. MASK PREBREATHE PREP

EV1,2 4.1 Relief Valve of 120-ft PHA Bags 1,2 →|← PHA port
Route EV1 hose from PHA port to CEVIS (secure bag to handrail).

4.2 Tether hose for strain relief.

4.3 Position Heart Rate Watch on CEVIS.
Install EV1 PCMCIA card in CEVIS.

4.4 Verify prime and backup bungees are configured (blue or black only).

4.5 Perform {2.2.050 CEVIS - ON LINE MODE OPERATIONS}, step 3 (SODF: MED OPS: NOMINAL: CMS), then:

4.6 Don Ergometer/CEVIS shoes.
Don other over-the-head garments.
Don TCU top.

4.7 Take one aspirin tablet (325 mg).

5. CONFIGURING FOR ONBOARD PHA COMM (IF REQUIRED)

5.1 EACP Y-Cable ←|→ ATU 4,5

5.2 PHA Comm Cables →|← Headset Control Unit (HCU)

✓ HCU →|← HCU Extension Cable

5.3 HCU Extension Cable →|← ATU (near activity)

5.4 HCU – PTT (to alleviate noise)

ATU 5.5 pb PTT → Press
pb 1 → Press (Big Loop)
pb 5 → Press (Airlock)

5.6 ✓ Display – ‘1G, 5T’ and other loops, as required
✓ Display – ‘PTT’

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INITIATING QUICK DON MASK PREBREATHE

WARNING

Positive mask O2 pressure and fit are necessary to ensure adequate prebreathe.

- EV1,2 PHA
6. Verify black plates in top of Quick Don Mask are seated in silicon.
 7. Don Quick Don Mask.
 8. Quick Don Mask O2 control → EMERGENCY
 9. Momentarily pull Quick Don Mask away from face.

√O2 flow

Record Quick Don Mask prebreathe initiation GMT in block A on the EVA PREBREATHE CUE CARD, start timer, **P/B PET = 0:00**

10. √Comm, as required

NOTE

Steps 11 to 13 should be performed in parallel.

- EV-1,IV
11. Perform exercise per EVA EXERCISE PRESCRIPTION steps 1 to 2 and 6 to 12 on EVA PREBREATHE CUE CARD, then:

EV2

12. EMU POWERUP (BOTH EMUs)

UIA

- 12.1 √sw PWR EV-1,2 (two) – OFF
√PWR EV-1,2 LEDs (four) – Off
√EMU O2 SUPPLY PRESS gauge: 850 to 950

C-Lk
wall

- 12.2 Remove SCU from stowage straps and pouches.
Transfer SCU to E-Lk.

DCM

- 12.3 Open DCM Cover
Attach Cover to DCM with Velcro.

- 12.4 SCU →|← DCM

√SCU locked

- 12.5 sw POWER → BATT

CAUTION

EMU must be on BATT power when UIA suit power is turned on.

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PSA 12.6 √sw SUIT SELECT (two) – OFF
 √sw EMU MODE EMU1,2 (two) – PWR

12.7 sw MAIN POWER → ON

√MAIN POWER LED – On

12.8 sw SUIT SELECT (two) → EMU 1,2

√EMU 1,2 LEDs (two) – On

√EMU 1,2 Volts: 18.0 to 19.0

UIA 12.9 sw PWR EV-1,2 (two) → ON

√PWR EV-1,2 EMU LEDs (two) – On

DCM 12.10 sw POWER → SCU

12.11 √STATUS: BATT VDC ≥ 20.3

UIA 13. OXYGEN EMU 1,2 vlv (two) → OPEN

NOTE

Steps 14 to 18 should be performed in parallel.

When EV1 Exercise complete

EV2,IV 14. Perform exercise per EVA EXERCISE PRESCRIPTION steps
 1 to 2 and 6 to 12 on EVA PREBREATHE CUE CARD, then:

EV1 Both
 EMUs

15. Waist ring ←|→ HUT

Temporarily stow LTA.

16. Helmet ←|→ HUT
Temporarily stow helmet.

17. Gloves ←|→ EMU
Temporarily stow gloves.

18. Remove Dosimeter from in-flight garments.
Insert Dosimeter in LCVG left leg pocket.

IV 19. Stow the following in E-Lk
 EVA PREBREATHE Cue Card.
 Food and drink for EV crew, if desired.

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EV1,2

20. If necessary, apply Medical Kit items.
Refer to {5.110 APPROVED NON-EMU HARDWARE}, all
(SODF: ISS EVA SYS: REFERENCE), as required.
21. Don MAG, TCU bottom, LCVG, biomed.
Refer to Figure 1.

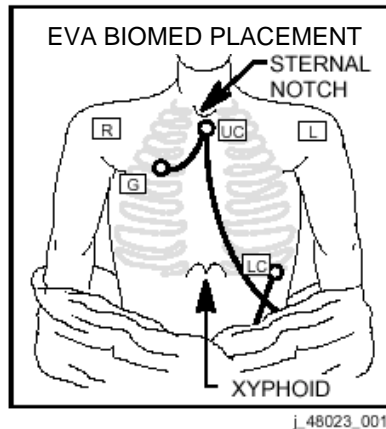


Figure 1.- Nondisposable Biomed Configuration.

IV

22. CLOSING NODE 1 STBD HATCH

NOTE

Be prepared to initiate depress within 5 minutes of closing the Node 1 Stbd Hatch to prevent high O2 concentrations in the Airlock.

When P/B PET = 50 minutes and 15 minutes post second EV crew exercise

22.1 ✓ **MCC-H** for Go to continue

22.2 ✓ Node 1 Stbd Hatch MPEV – CLOSED and uncapped

22.3 Check hatch seal and close Node 1 Stbd Hatch per decal
(omit last step of decal).

WARNING

Do not initiate depress until 50 minutes of mask prebreathe and 15 minutes post second EV crew exercise are complete. The depress time from 760 mmHg (14.7 psia) to 527 mmHg (10.2 psia) must be greater than 20 minutes.

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23. DEPRESSING TO 10.2 PSIA

EV1,2 23.1 Momentarily pull Quick Don Mask away from face to verify positive O2 flow

* If no positive O2 flow, contact **MCC-H**.

NOTE

1. EV crew should perform steps 23.2 to 23.8 while IV is depressing Airlock to 10.2 psia (527 mmHg) in steps 23.9 to 23.23.
2. EMU displays **O2 IS OFF** message during Airlock depress, sw DISP → PRO, as required.

DCM 23.2 ✓STATUS **SOP P**: > 5410 (compare with gauge)

23.3 ✓Waist ring – open

23.4 Don LTA (attach donning handles as required).

If boot bladder manipulation required

23.5 Boot ←|→ Leg (sizing ring)

23.6 Pull up excess boot bladder around full circumference of boot disconnect.

WARNING

Keep bladder material clear of threads during reconnection of boot.

23.7 Boot →|← Leg (sizing ring)

23.8 Lock 1 → LOCK

✓All locks (three per boot) are engaged

IV UIA 23.9 ✓DEPRESS PUMP ENABLE LED – On

UIA 23.10 sw DEPRESS PUMP PWR → ON

Wait 10 seconds.

C-Lk 23.11 DEPRESS PUMP MAN ISOV → OPEN

✓Cab Press – Decreasing (use Vacuum Manometer or PCS)

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PCS

Airlock: ECLSS

Airlock: ECLSS

'Equipment Lock'

23.12 Start depress PET clock.

Record start time in Block C of EVA PREBREATHE CUE CARD.

When Cab Press < 14.1 psia (729 mmHg)

23.13 Turn Hatch handle in the UNLATCH direction approximately 1.5 turns to place the Hatch in the equalize position (orange stripe).

23.14 Crank Handle – Stowed position

NOTE

1. CSA-CP % O2 will read approximately 1 % lower than actual during depress. Stable Airlock pressure is needed to obtain an accurate reading.
2. Per SPN 2563 (12A to 20A), each MCA partial pressure reading of the Airlock will be 86 seconds old before the depress begins, and will increase up to 99 seconds old at 10.2 psia.

23.15 Monitor O2 using CSA-CP during depress.

Refer to Figure 2.

When Airlock is at 11.8 (610 mmHg)

C-Lk

23.16 DEPRESS PUMP MAN ISOV → CLOSED

23.17 Wait for depress PET = 15 minutes and O2 > 24.5 %

23.18 ✓ **MCC-H** for Go to continue

23.19 DEPRESS PUMP MAN ISOV → OPEN

23.20 Continue DEPRESS to 10.2 psia (527 mmHg).

Refer to Figure 2.

23.21 DEPRESS PUMP MAN ISOV → CLOSED

23.22 Verify O2 is between 23.5 and 28.8 %.

UIA 23.23 sw DEPRESS PUMP PWR → OFF

MCC-H/IV 23.24 Perform {1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION}, step 8 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:

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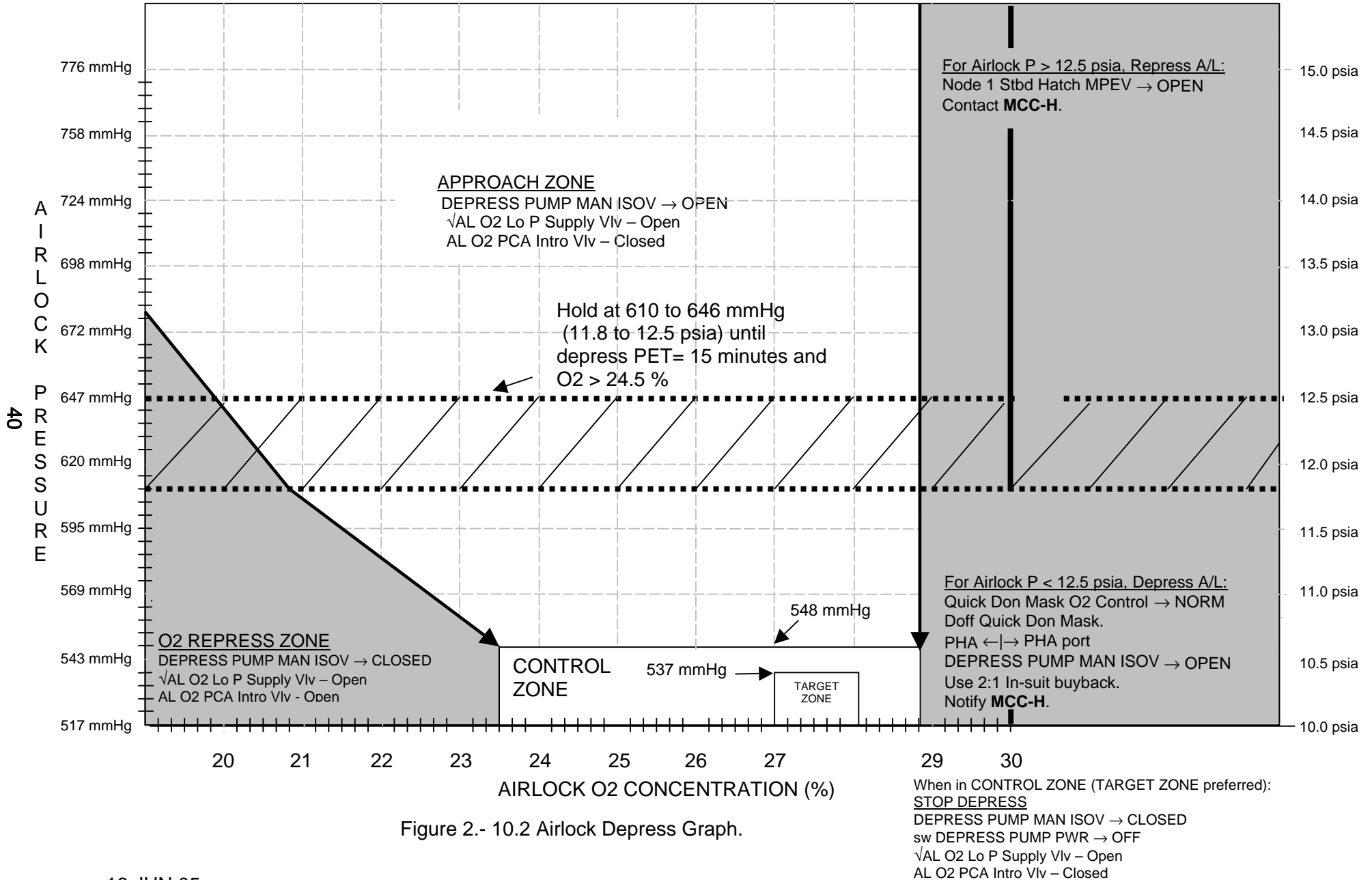


Figure 2.- 10.2 Airlock Depress Graph.

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WARNING

Do not terminate Quick Don Mask prebreathe until:

- Airlock at 10.2 psia (527 mmHg)
- P/B PET > 1:20
- 0:45 since finishing EV2 exercise
- Airlock O2 between 23.5 and 28.8 %

PHA

When Quick Don Mask prebreathe complete

- ☐☐☐☐ 24. Momentarily pull Quick Don Mask away from face to verify positive O2 flow.

* If no positive O2 flow, contact **MCC-H**.

- ☐☐☐☐ 25. Quick Don Mask O2 control → NORMAL

Record Mask Prebreathe Terminate P/B PET in block D on EVA PREBREATHE CUE CARD.

- ☐☐☐☐ 26. Doff Quick Don Mask.

- A/L1D2 ☐☐☐☐ 27. Relief Valve of PHAs ←|→ PHA port

Install cap on PHA port.

- ☐☐☐☐ 28. Unstow biomed pigtail from EMU Servicing Kit.

Biomed pigtail →|← signal conditioner

Biomed pigtail →|← electrical harness

- ☐☐☐☐ 29. Don comm cap.

NOTE

Due to an RF interference issue between the hand-held mics and the EMU radios, the hand-held mic should not be used in the vicinity of powered EMU radios.

- DCM ☐☐☐☐ 30. sw COMM mode → PRI (hot mic to **MCC-H**)

- ☐☐☐☐ 31. √sw Comm FREQ – LOW

- ☐☐☐☐ 32. Verify biomed, EMU data, RF comm with **MCC-H**.

- ☐☐☐☐ 33. sw COMM mode → HL

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☐☐☐☐ 34. Doff comm cap.

☐☐☐☐ 35. Biomed pigtail ←|→ electrical harness

ATU4,5 ☐☐☐☐ 36. √EACP Y-Cable →|← ATUs

EACP ☐☐☐☐ 37. √EACP Y-Cable →|← EACP

sw PWR → ON

√EMU1,2 mode sel (two) – DUAL

ATU4,5,6 ☐☐☐☐ 38. pb PTT → Press
pb 1 → Press (Big Loop)
pb 3 → Press (Shuttle/ISS ICOM)
pb 5 → Press (Airlock)

√Display – ‘**1G, 3, 5T**’ other comm. loops as required

√Display – ‘**DUAL**’

EMU DONNING (55 MINUTES)

NOTE

May be performed by EV1 and EV2 simultaneously.

☐☐☐☐ 39. √EDDA latched

☐☐☐☐ 40. Take one aspirin tablet (325 mg), if not taken previously.

☐☐☐☐ 41. √Suit arms aligned

☐☐☐☐ 42. √Gloves ←|→ EMU
√Wrist disconnects – op

☐☐☐☐ 43. Stow IV glasses as required.

☐☐☐☐ 44. Don thumb loops.

☐☐☐☐ 45. √Drink vlv position

☐☐☐☐ 46. √Biomed connector is outside of HUT

☐☐☐☐ 47. Don HUT.

☐☐☐☐ 48. Release thumb loops.

☐☐☐☐ 49. √Suit arms aligned

☐☐☐☐ 50. Don EV glasses as required.
Don comm cap.

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☐☐☐☐ 51. √Comm

☐☐☐☐ 52. Biomed pigtail →|← electrical harness

☐☐☐☐ 53. LCVG →|← Multiple Water Connector

√Multiple Water Connector locked

☐☐☐☐ 54. √Thermal cover clear of waist ring

☐☐☐☐ 55. Waist ring → engage position

☐☐☐☐ 56. Waist ring →|← HUT

√Waist ring locked

☐☐☐☐ 57. Remove donning handles.
Stow donning handles in EMU Equipment Bag.

☐☐☐☐ 58. Cover waist ring.

CAUTION

Pulling on blue bite valve to adjust position
can cause valve to release from stem.

☐☐☐☐ 59. √Drink vlv position

☐☐☐☐ 60. √Mic boom position

☐☐☐☐ 61. Don comfort gloves, wristlets.

☐☐☐☐ 62. Wrist rings → engage position

☐☐☐☐ 63. Don EV gloves.

√EV gloves locked

☐☐☐☐ 64. Tighten palm restraint straps.

☐☐☐☐ 65. √sw Glove heater (two) – OFF

☐☐☐☐ 66. √sw REBA – OFF (pull tab toward left arm of suit)

☐☐☐☐ 67. Lower arm power harness cables →|← Gloves

Stow slack under arm TMG.

☐☐☐☐ 68. √Cuff C/L position
√Wrist mirrors installed

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CAUTION

Flexible Ventilation Duct must be removed from Crewlock prior to taking EMU Fan to ON to avoid ice formation on UIA water lines.

- ☐☐☐☐ 69. Rotate Flexible Ventilation Duct out of C-Lk.

CAUTION

Minimize fan operation with O2 ACT – OFF (~ 2 minutes).

- DCM ☐☐☐☐ 70. sw FAN → ON

- ☐☐☐☐ 71. √Electrical harness clear of neck ring

- ☐☐☐☐ 72. Don helmet.

√Helmet locked

- DCM ☐☐☐☐ 73. O2 ACT → IV

- ☐☐☐☐ 74. √Helmet purge vlv – cl, locked

- DCM ☐☐☐☐ 75. PURGE vlv → cl (dn)

If EMU TV capability

- ☐☐☐☐ 76. Unstow EMU TV power cable.

- ☐☐☐☐ 77. EMU TV power cable ←|→ Ground plug

- ☐☐☐☐ 78. EMU TV power cable →|← EMU TV

- EV2 ☐☐☐☐ 79. Repeat steps 39 to 78 if donning performed serially.

EMU CHECK (5 MINUTES)

- Both ☐☐☐☐ 80. √Cooling

* If cooling insufficient

* | Slowly cycle Temp control vlv between 7 and Max C
* | while IV depresses and holds pump priming valve
* | on back of EMU (30 seconds minimum).

- DCM ☐☐☐☐ 81. Temp control vlv → as required

- ☐☐☐☐ 82. √Wrist rings – covered

- ☐☐☐☐ √Waist rings – covered

- DCM ☐☐☐☐ √sw WATER – OFF (switch guard installed)

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<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√sw POWER	– SCU
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√sw FAN	– ON
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√sw Comm FREQ	– LOW
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√Helmet lights	– Operational
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√Helmet purge vlv	– cl, locked
DCM <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	√PURGE vlv	– cl (dn)

NOTE

During leak check, when **SET O2 IV** message is displayed, wait 30 seconds and √SUIT P gauge stable (4.2 to 4.4) before moving O2 ACT → IV.

- ☐☐☐☐ 83. sw DISP → STATUS until **LEAK CHECK?** displayed
sw DISP → YES, follow displayed instructions.

* If **LEAKAGE HI** **SUIT P X.X**
* | Perform {2.115 FAILED LEAK CHECK (14.7/10.2 PSIA)},
* | all (SODF: ISS EVA SYS: EMU CONTINGENCY), then:

84. Go to {1.220 EMU PURGE}, all (SODF: ISS EVA SYS: EVA PREP/POST).

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1.220 EMU PURGE

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 1 of 2 pages

OBJECTIVE:

Purge cabin air from the EMU prior to in-suit prebreathe.

NOTE

Flex arms and legs periodically and avoid overcooling during purge/prebreathe.

BOTH DCM

1. O2 ACT → PRESS
2. Verify no EMU fit issues.
3. PURGE vlv → op (up), begin 12-minute purge clock

For exercise protocol, record GMT purge start time in block E of EVA PREBREATHE CUE CARD, inform **MCC-H**.

For campout protocol, record GMT purge start time here.

GMT (PURGE INIT:) ____/____:____ ____

MCC-H/IV

4. INHIBITING ISS RAPID DEPRESS RESPONSE AND ALARM
 - 4.1 Perform {1.110 ISS AIRLOCK 10.2 PSIA OPERATIONS TERMINATION}, step 1 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:
 - 4.2 Verify Russian Segment Rapid Depress Response inhibited

WARNING

To ensure sufficiently low PPN2 levels in the EMU, do not repress Equipment Lock until 5 minutes of purge is complete.

When 5 minutes of purge complete

NOTE

1. If shuttle docked, airlock repress may cause shuttle dP/dT alarm.
2. Airlock repress will take approximately 7 minutes with the Node Stbd Hatch MPEV open.

IV

5. Inform shuttle crew of airlock repress initiation, as required.
6. Verify with **MCC-H** step 4 complete and **GO** for repress. Node 1 Stbd Hatch MPEV → throttled Open to Close (as required)
7. Open Node 1 Stbd Hatch per decal.

1.220 EMU PURGE

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- | | |
|----------|--|
| BOTH DCM | <p>When 12-minute purge complete</p> <ol style="list-style-type: none">8. PURGE vlv → cl (dn)9. O2 ACT → IV10. For Exercise protocol, record GMT of in-suit prebreathe start time on block F of EVA PREBREATHE CUE CARD.

For Campout protocol, record GMT of in-suit prebreath start time here.

<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">GMT (IN-SUIT P/B INIT:) ____/____:____ ____</div> |
| MCC-H/IV | <ol style="list-style-type: none">11. ENABLING ISS RAPID DEPRESS RESPONSE AND ALARM
Perform {1.110 ISS AIRLOCK 10.2 PSIA OPERATIONS
TERMINATION}, step 2 to 7 (SODF: ISS EVA SYS: 10.2 PSIA
OPS), then:12. Go to {1.225 EMU PREBREATHE} (SODF: ISS EVA SYS: EVA
PREP/POST). |

1.225 EMU PREBREATHE

(ISS EVA SYS/7A - ALL/FIN 6/HC/Paper on ISS)

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I

OBJECTIVE:

To perform the required in-suit prebreathe prior to an EVA.

1. Monitor prebreathe clock.

Protocol	Prebreathe Duration
Exercise	01:00
Campout	00:40
14.7 psi	04:00

If 14.7 psi protocol

2. ✓ **MCC-H** for additional EMU water dump requirements

PHA

3. Depress Quick Don Mask O2 control to bleed down line.
Install caps on PHA fittings.
4. Use spare Quick Don Mask to bleed down 90-ft PHA (if using shuttle O2)
Spare Quick Don Mask ←|→ 90-ft PHA
5. Stow PHA Quick Don Masks in PHA Bags.
6. Return additional PBAs retrieved from other modules to original stowage lockers.
Inform **MCC-H** PBAs are restowed.
7. Install miniworkstation, tools, waist tethers, BRTs as required on EMUs.
8. Egress EDDA.
Stow EDDA handles.

SAFER DONNING (30 MINUTES)

IV

9. Remove SAFER from Stowage Bag.
Remove Stowage Straps (two) from thruster towers.
Stow Stowage Straps in EMU Equipment Bag.
Unfold thruster towers.
10. Inspect:
Thruster tower hinges
Tower latches

✓TMG not blocking thrusters
11. ✓TMG clear from SAFER striker plate on EMU PLSS
12. Remove Inhibitor.
Close, fasten port cover.
Stow Inhibitor in EMU Equipment Bag.

1.225 EMU PREBREATHE

(ISS EVA SYS/7A - ALL/FIN 6/HC/Paper on ISS)

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13. MAN ISOL vlv → OP (dn)
14. Latch → PRELOAD
15. Latch ↶ to recess butterfly in housing.

CAUTION

Latch ↶ past softstop can bind latch.

16. Latch ↶ to softstop.

If required

17. Latch ↶ to align latch collar with square bolt head.
18. Latch → ENG
19. PLSS →|← thruster towers
20. Push latch in and ↷ (~90°).

- * If latch will not engage
- * | Latch → PRELOAD
- * | Latch ↶
- * | Return to step 16.

21. Latch → PRELOAD
22. Latch ↷ until ratcheting.

CAUTION

Latch ↷ may disengage SAFER.

23. Continue ratcheting until lock marking on latch and tower aligned.
24. Latch → LCK
25. ✓ Access to HCM deploy lever
✓ TMG not blocking thrusters
26. Repeat steps 9 to 25 for SAFER 2.

A/L1A1

27. DEACTIVATING CO2 REMOVAL
27.1 Rotate EDDA open.

27.2 Open CO2 Removal Receptacle door.

27.3 Remove Metox canisters from CO2 Removal Receptacle.

1.225 EMU PREBREATHE

(ISS EVA SYS/7A - ALL/FIN 6/HC/Paper on ISS)

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- 27.4 Unstow Metox canister caps from EMU Equipment Bag.
- 27.5 Install caps on Metox canisters.
- 27.6 Report canister barcode to **MCC-H** as comm permits.
- 27.7 Temporarily stow Metox canisters for future regeneration or use.
- 27.8 Close and latch CO2 Removal Receptacle door.
- 27.9 Rotate EDDA closed.

PREPARING FOR DEPRESS (10 MINUTES)

IV

- 28. Remove loose equipment from C-Lk.

√EVA tools and ORUs installed in C-Lk as required for EVA

- 29. sw REBA → ON, pull tab toward right arm of suit

If EMU TV capability

- 30. pb EMU TV power → Press

√Green LED – On

EV

- 31. Ingress C-Lk.

C-Lk

- 32. √DEPRESS PUMP MAN ISOV – CLOSED

IV

DCM

- 33. Remove water switch guard (two).
Stow water switch guard in EMU Equipment Bag.

IV

- 34. Egress C-Lk.

CAUTION

Verify EV crew is clear of hatch mechanism.

- 35. IV Hatch → CLOSE, lock
- 36. √IV Hatch equalization valve – OFF (√cap remains removed)
- 37. √EMERGENCY MPEV – CLOSED

1.225 EMU PREBREATHE

(ISS EVA SYS/7A - ALL/FIN 6/HC/Paper on ISS)

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		When in-suit prebreathe time complete	
PCS		38.	Airlock: ECLSS: PCA: VRIV <div>AL PCA VRIV</div> 'Open' cmd Arm (✓Status – Armed) cmd Open (✓Position – Open)
EV	UIA	39.	✓sw DEPRESS PUMP PWR – OFF ✓DEPRESS PUMP ENABLE LED – On On MCC-H GO , go to CREWLOCK DEPRESS portion of {CREWLOCK DEPRESS/REPRESS CUE CARD} (SODF: ISS EVA SYS: EVA PREP/POST).

HOOK
VELCROHOOK
VELCRO**CREWLOCK DEPRESS/REPRESS CUE CARD**

(ISS EVA SYS/7A - ALL/FIN 6/HC/Paper on ISS)

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CREWLOCK DEPRESS (30 MINUTES) (45 MINUTES FOR EXERCISE PROTOCOL)

- When prebreathe complete
- DCM 1. √sw Comm FREQ – LOW
2. sw COMM mode → PRI
- UIA 3. sw DEPRESS PUMP PWR → ON
(wait 10 seconds for complete startup)
- C-Lk 4. DEPRESS PUMP MAN ISOV → OPEN, (EV expect alert tone)
Start Depress PET clock.
Monitor Suit P gauge < 5.5.
- *****
- * If gauge > 5.5
- * | Stop depress, √**MCC-H**.
- *****
- DCM 5. C-Lk at 6.0, (EV expect alert tone)
- When C-Lk at 5.0 psia (259 mm Hg)
- C-Lk 6. DEPRESS PUMP MAN ISOV → CLOSED, (EV expect alert tone)
- DCM 7. sw DISP → STATUS until **LEAK CHECK?** displayed
sw DISP → YES, follow displayed instructions
- *****
- * If **LEAKAGE HI | SUIT P X.X**
- * | Perform {2.110 **FAILED LEAK CHECK (5 PSIA)**}
- * | (SODF: ISS EVA SYS: EMU CONTINGENCY), then:
- *****
8. √O2 ACT – EVA
- For Exercise Protocol, hold at 5.0 psia until Depress PET = 00:25, then:
- C-Lk 9. DEPRESS PUMP MAN ISOV → OPEN, (EV expect alert tone)
- IV A/L1A2 10. Emergency MPEV → Open
Monitor SUIT P gauge < 5.5.
- *****
- * If gauge > 5.5
- * | Stop depress, √**MCC-H**.
- *****
- When C-Lk at 2.0 psia (103 mm Hg)
- C-Lk 11. DEPRESS PUMP MAN ISOV → CLOSED
- UIA 12. sw DEPRESS PUMP PWR → OFF
- C-Lk 13. Attach waist tethers to C-Lk D-ring for egress.
- DCM When C-Lk dP/dT ~ 0, (EV expect alert tone)
- When EV Hatch ΔP < 0.5 psi (26 mm Hg)
- C-Lk 14. EV Hatch → open, stow
- IV A/L1A2 15. Emergency MPEV → Closed

POST DEPRESS (5 MINUTES)

- DCM 1. sw POWER → BATT (stagger switch throws), expect warning tone
(IV record GMT ____/____:____) EVA PET = 00:00
- UIA 2. sw PWR EV-1,2 (two) → OFF
√PWR EV-1,2 LEDs (four) – Off
- DCM 3. SCU ←|→ DCM
4. Install DCM cover.
5. Stow SCU in pouch.
- C-Lk 6. √DEPRESS PUMP MAN ISOV – CLOSED
- DCM 7. Temp control vlv → Max H
8. sw WATER → ON
9. √DCM blank, BITE – off
10. Temp control vlv → 3 to Max C
11. √STATUS, Compare to Cuff Checklist page 1 (IV record)
12. Visors as required.
- IV PCS 13. Airlock: ECLSS: PCA: VRIV
cmd Close (√Position – Closed)
14. Go to {**CREWLOCK EGRESS**} (SODF: ISS EVA SYS: CUFF
CHECKLIST) page 34 or EVA specific timeline.

EVA-1a/7A - ALL/F

HOOK
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HOOK
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CREWLOCK DEPRESS/REPRESS CUE CARD

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PRE REPRESS (5 MINUTES)

- DCM
1. √SCU →|← DCM
2. √sw WATER – OFF for 2 minutes
3. √EV Hatch closed, locked
4. Waist tethers ←|→ C-Lk D-ring, attach to EMUs
- UIA
5. √OXYGEN EMU1,2 vlv (two) – OPEN
6. sw PWR EV-1,2 (two) → ON
- √PWR EV-1,2 EMU LEDs (two) – On
- √PWR EV-1,2 VOLTS = 18.0 to 19.0
- DCM
7. sw POWER → SCU, (EV expect warning tone)

CREWLOCK REPRESS (10 MINUTES)

WARNING

If on SOP, leave O2 ACT – EVA thru C-Lk repress.

- DCM
1. O2 ACT → PRESS
2. sw COMM mode → HL
- C-Lk
3. √EV Hatch MPEV – CLOSED
4. Notify shuttle crew of possible -dP/dT alarm during repress.
- IV Hatch equalization vlv → throttle OFF to NORM (as required),
- (EV expect alert tone)
- (IV record GMT_____/_____:_____)
- DCM
5. C-Lk at 4.0, (EV expect alert tone)
- When C-Lk at 5.0 (259 mm Hg)
- C-Lk
6. IV Hatch equalization valve → OFF, (EV expect alert tone)
- Wait 2 minutes for C-Lk pressure to stabilize, then:
- IV
- PCS
7. Airlock: ECLSS
- Record Crew Lock Press: _____mmHg (P1)
- Wait 1 minute, then record again: _____mmHg (P2)
- *****
- * If $\Delta P \geq 9$ mmHg (where $\Delta P = P1-P2$)
- * | Go to {4.150 CREWLOCK LARGE LEAK
- * | RESPONSE} (SODF: ISS EVA SYS:
- * | EMERGENCY).
- * |
- * If $\Delta P > 2$ mmHg (where $\Delta P = P1-P2$)
- * | Go to {2.205 CREWLOCK SMALL LEAK
- * | RESPONSE} (SODF: ISS EVA SYS: AIRLOCK
- * | CONTINGENCY).
- *****
8. √sw Gloves heaters – OFF, gloves clean
- WARNING

1. If CUFF 1 symptoms resolving upon repress, report as CUFF 2.

2. If any DCS, leave O2 ACT – PRESS.
- DCM
9. O2 ACT → IV
- C-Lk
10. IV Hatch equalization vlv → NORM, (EV expect alert tone)
- DCM
- When C-Lk dP/dT ~ 0, (EV expect alert tone)
11. Go to {1.240 POST EVA} (SODF: ISS EVA SYS: EVA PREP/POST).

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EMU STATUS

	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	
TIME EV													
TIME LF													
% PWR													
% O2													
SUIT P			Report status to MCC when:										
O2 P			<ul style="list-style-type: none">Any parameter outside normal range										
SOP P			<ul style="list-style-type: none">TIME LF ≤ required										
SUBLM P			<ul style="list-style-type: none">Limiting consumable changes (PWR↔O2)										
BAT VDC			<ul style="list-style-type: none">ΔTIME LF between EV1 and EV2 ≥1 hour										
BAT AMP			<u>NORMAL STATUS</u>										
RPM			<ul style="list-style-type: none">O2 POS			EVA							
CO2			<ul style="list-style-type: none">TIME EV			HR:MIN left since PWR-BATT							
H2O TEMP			<ul style="list-style-type: none">TIME LF/limiting consum			HR:MIN remaining at present use rate							
H2O GP			% O2(PWR) LF			Displayed if not limiting consumable							
H2O WP			SUIT P			4.2 to 4.4 psid							
GAUGE			O2 P			150 to 950 psid		TIME EV					
			SOP P			5410 to 6800 psia		TIME LF					
			SUBLM P			2.0 to 4.2 psia		% PWR					
			BAT VDC			≥ 16.7		% O2					
			BAT AMP			3.0 to 4.0							
			RPM			18.0 to 20.0 k		TIME EV					
			CO2			0.2 to 2.0 mmHg		TIME LF					
			H2O TEMP			32 to 75 degF		% PWR					
			H2O GP/WP			14.0 to 16.0 psid		% O2					

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EMU STATUS

	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2
TIME EV												
TIME LF												
% PWR												
% O2												
SUIT P			Report status to MCC when: <ul style="list-style-type: none">Any parameter outside normal rangeTIME LF ≤ requiredLimiting consumable changes (PWR↔O2)ΔTIME LF between EV1 and EV2 ≥1 hour									
O2 P												
SOP P												
SUBLM P												
BAT VDC												
BAT AMP			NORMAL STATUS									
RPM												
CO2												
H2O												
TEMP												
H2O GP			% O2(PWR) LF		Displayed if not limiting consumable							
H2O WP			SUIT P									
GAUGE			O2 P									
			SOP P									
			SUBLM P									
			BAT VDC									
			BAT AMP									
			RPM									
			CO2									
			H2O TEMP									
			H2O GP/WP									

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EMU STATUS

	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2
TIME EV												
TIME LF												
% PWR												
% O2												
SUIT P			Report status to MCC when: <ul style="list-style-type: none"> Any parameter outside normal range TIME LF \leq required Limiting consumable changes (PWR\leftrightarrowO2) ΔTIME LF between EV1 and EV2 \geq1 hour 									
O2 P												
SOP P												
SUBLM P												
BAT VDC												
BAT AMP			NORMAL STATUS EVA									
RPM												
CO2			HR:MIN left since PWR-BATT HR:MIN remaining at present use rate									
H2O TEMP												
H2O GP			Displayed if not limiting consumable 4.2 to 4.4 psid									
H2O WP												
GAUGE			SUIT P O2 P SOP P SUBLM P BAT VDC BAT AMP RPM CO2 H2O TEMP H2O GP/WP									
			150 to 950 psid 5410 to 6800 psia 2.0 to 4.2 psia \geq 16.7 3.0 to 4.0 18.0 to 20.0 k 0.2 to 2.0 mmHg 32 to 75 degF 14.0 to 16.0 psid									
			TIME EV TIME LF % PWR % O2									
			TIME EV TIME LF % PWR % O2									

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EMU STATUS

	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2
TIME EV												
TIME LF												
% PWR												
% O2												
SUIT P			Report status to MCC when:									
O2 P												
SOP P												
SUBLM P												
BAT VDC												
BAT AMP			NORMAL STATUS									
RPM												
CO2												
H2O TEMP												
H2O GP												
H2O WP												
GAUGE												
			• O2 POS				EVA					
			• TIME EV				HR:MIN left since PWR-BATT					
			• TIME LF/limiting consum				HR:MIN remaining at present use rate					
			% O2(PWR) LF				Displayed if not limiting consumable					
			SUIT P				4.2 to 4.4 psid					
			O2 P				150 to 950 psid	TIME EV				
			SOP P				5410 to 6800 psia	TIME LF				
			SUBLM P				2.0 to 4.2 psia	% PWR				
			BAT VDC				≥ 16.7	% O2				
			BAT AMP				3.0 to 4.0					
			RPM				18.0 to 20.0 k	TIME EV				
			CO2				0.2 to 2.0 mmHg	TIME LF				
			H2O TEMP				32 to 75 degF	% PWR				
			H2O GP/WP				14.0 to 16.0 psid	% O2				

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EMU STATUS

	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2	EV1	EV2					
TIME EV																	
TIME LF																	
% PWR																	
% O2																	
SUIT P			Report status to MCC when: <ul style="list-style-type: none">Any parameter outside normal rangeTIME LF ≤ requiredLimiting consumable changes (PWR↔O2)ΔTIME LF between EV1 and EV2 ≥1 hour														
O2 P																	
SOP P																	
SUBLM P																	
BAT VDC																	
BAT AMP			<u>NORMAL STATUS</u> EVA HR:MIN left since PWR-BATT HR:MIN remaining at present use rate Displayed if not limiting consumable														
RPM																	
CO2																	
H2O TEMP																	
H2O GP																	
H2O WP			4.2 to 4.4 psid 150 to 950 psid 5410 to 6800 psia 2.0 to 4.2 psia ≥ 16.7 3.0 to 4.0 18.0 to 20.0 k 0.2 to 2.0 mmHg 32 to 75 degF 14.0 to 16.0 psid								TIME EV						
GAUGE											O2 P		TIME LF				
											SOP P		% PWR				
											SUBLM P		% O2				
											BAT VDC						
			BAT AMP														
			RPM		TIME EV												
			CO2		TIME LF												
			H2O TEMP		% PWR												
			H2O GP/WP		% O2												

1.240 POST EVA

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I

(80 Minutes)

OBJECTIVE:

Doff EMUs after an EVA and perform required maintenance activities.

CAUTION

Verify EV crew is clear of hatch mechanism.

IV

When equalization complete

1. Open IV Hatch per decal.

IV Hatch equalization valve → OFF

* If required, IV use damp towel to clean gloves.

SAFER DOFFING (5 MINUTES)

IV

SAFER

- ☐☐☐☐ 2. Latch → ENG

- ☐☐☐☐ 3. Latch ↶ until release (~90 deg).

- ☐☐☐☐ 4. PLSS ←|→ Thruster Towers

- ☐☐☐☐ 5. Install Inhibitor (not required if SAFER has been used).

- ☐☐☐☐ 6. Temporarily stow SAFER in C-Lk.

- ☐☐☐☐ 7. Repeat steps 2 to 6 for SAFER 2.

SUIT DOFFING (25 MINUTES)

- ☐☐☐☐ 8. Engage EMU in EDDA.

- ☐☐☐☐ 9. Remove tools, as required.

WARNING

Do not doff EMU if DCS symptoms resolved during REPRESS. √MCC-H via PMC

BOTH DCM

- ☐☐☐☐ 10. O2 ACT → OFF

- ☐☐☐☐ 11. PURGE vlv → op (up)

IV

- ☐☐☐☐ 12. Install WATER switch guards (two).

If EMU TV capability

- ☐☐☐☐ 13. pb EMU TV power → OFF

√EMU TV POWER LED (green) – Off

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PLSS ☐☐☐☐ 14. sw REBA → OFF (toward left arm of suit)

If EMU TV capability

☐☐☐☐ 15. EMU TV Power Cable ←|→ EMU TV
EMU TV Power Cable →|← Ground Plug

☐☐☐☐ 16. Lower Arm Cables ←|→ Gloves

Stow lower arm and glove cable connectors under TMG.

DCM ☐☐☐☐ 17. √STATUS: SUIT P < 0.4 (compare with gauge)

Gloves ←|→ EMU

Stow gloves in EMU Equipment Bag.

☐☐☐☐ 18. Helmet ←|→ EMU

Temporarily stow helmet.

☐☐☐☐ 19. sw COMM mode → OFF

☐☐☐☐ 20. Doff comm cap.
Doff EV glasses.

DCM ☐☐☐☐ 21. sw FAN → OFF

☐☐☐☐ 22. Waist Ring ←|→ HUT

☐☐☐☐ 23. LCVG ←|→ Multiple Water Connector

☐☐☐☐ 24. Biomed Pigtail ←|→ Electrical Harness

☐☐☐☐ 25. √Wrist disconnects – op

EV ☐☐☐☐ 26. Doff HUT.

☐☐☐☐ 27. Doff LTA.
Temporarily stow LTA.

☐☐☐☐ 28. Doff biomed, LCVG, TCUs.

☐☐☐☐ 29. Doff MAG.
Seal MAG in Ziplock Bag and dispose.

☐☐☐☐ 30. Remove dosimeter from LCVG.

☐☐☐☐ 31. Biomed Pigtail ←|→ Signal Conditioner

Stow biomed pigtail in EMU Servicing Kit.

1.240 POST EVA

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IV ATU 4,5 ☐☐☐☐ 32. pb HANG UP → Press
pb 1(2,3,4,5) → Press

EACP ☐☐☐☐ 33. sw PWR → OFF

A/L1A ☐☐☐☐ 34. Rotate Flexible Ventilation Duct into C-Lk.
Secure duct with Velcro strap.

EVA COMM AND AIRLOCK ENVIRONMENT DECONFIG

☐☐☐☐ 35. Perform shuttle EVA COMM DECONFIG, (FDF: EVA:
EVA PREP) if required, then:

MCC-H/IV ☐☐☐☐ 36. Perform {2.210 AUDIO SUBSYSTEM
DECONFIGURATION FROM UHF OPS}, all (SODF:
C&T: NOMINAL: AUDIO), then:

☐☐☐☐ 37. Perform {2.702 UHF 1 ORU DEACTIVATION}, all
(SODF: C&T: NOMINAL: UHF), then:

WATER RECHARGE/METOX REGEN INIT (15 MINUTES)

If EMU Water Recharge required per timeline

IV ☐☐☐☐ 38. Perform {1.505 EMU WATER RECHARGE},
Initiate steps, (SODF: ISS EVA SYS: EMU
MAINTENANCE), then:

If Metox regeneration required per timeline

☐☐☐☐ 39. Remove Metox from EMUs.
Install EMU Vent Port Plugs on CCC ports.

☐☐☐☐ 40. Perform {1.510 METOX REGENERATION}, all
(SODF: ISS EVA SYS: EMU MAINTENANCE),
then:

☐☐☐☐ 41. ✓PLSS thermal cover on back of EMU – closed

OXYGEN RECHARGE VERIFICATION (5 MINUTES)

DCM ☐☐☐☐ 42. STATUS:

☐☐☐☐ 43. Continue charge until O2 P > 850 psi.
Record O2 P.
Report to **MCC-H** as comm permits.

EMU	O2 P

UIA ☐☐☐☐ 44. OXYGEN EMU 1,2 vlv (two) → CLOSE

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PCS

☐☐☐☐ 45. [RECONFIGURING O2 SYSTEM](#)

45.1 C&W Summ

'Event Code Tools'

sel Inhibit

input Event Code – 6 6 0 3 (O2 UIA Supply
Pressure Low-A/L)

cmd Arm

cmd Execute

45.2 sel Suppress

input Event Code – 5 0 1 3 (Primary INT MDM
Fail-LAB)

cmd Arm

cmd Execute

45.3 Airlock: ECLSS: O2 Hi Pressure Supply Valve

cmd Close (✓Actual Position – Closed)

[SAFER STOW \(5 MINUTES\)](#)

SAFER ☐☐☐☐ 46. Latch → PRELOAD

☐☐☐☐ 47. Latch ↻ until lock markings on latch and tower recess
aligned.

☐☐☐☐ 48. Push in latch.

Latch → LCK

☐☐☐☐ 49. Fold thruster towers, install stowage straps (two).

☐☐☐☐ 50. MAN ISOL vlv → CL (up)

☐☐☐☐ 51. Stow SAFER in SAFER stowage bag in C-Lk.

[WATER RECHARGE TERM \(5 MINUTES\)](#)

If EMU Water Recharge required per timeline

☐☐☐☐ 52. Perform {1.505 EMU WATER RECHARGE},
Terminate steps, (SODF: ISS EVA SYS: EMU
MAINTENANCE), then:

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☐☐☐☐ 53. POWERING DOWN EMUs

NOTE

When performing EMU powerdown, SCUs may remain connected to the EMUs if additional EMU operations are planned.

UIA

53.1 sw PWR EV-1,2 (two) → OFF

√PWR EV-1,2 LEDs (four) – Off

√PWR EV-1,2 VOLTS: ~00.0

53.2 √OXYGEN EMU 1,2 vlv (two) – CLOSE

PSA

53.3 sw SUIT SELECT (two) → OFF

√SUIT SELECT LEDs (four) – Off

53.4 sw MAIN POWER → OFF

√MAIN POWER LED – Off

DCM

53.5 SCU ←|→ DCM

53.6 Install DCM cover.

C-Lk wall

53.7 Insert SCU in stowage pouch.

SUIT DRYING/SEAL WIPE (10 MINUTES)

☐☐☐☐ 54. Wipe with drying towel:

LTA, legs, boots

HUT, suit arms

Gloves

WARNING

Avoid stericide contact with eyes. Wash hands thoroughly after application.

☐☐☐☐ 55. Wipe LTA crotch with stericide (in EMU Servicing Kit).

☐☐☐☐ 56. Lightly wipe seals on LTA waist ring, arm wrist rings, HUT neck ring, helmet interior with lint-free wipe (in EMU Servicing Kit).

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- ☐☐☐☐ 57. Install Multiple Water Connector cover.
- ☐☐☐☐ 58. Clean, refurbish biomed.
- ☐☐☐☐ 59. Remove drink bags from EMU.
Dispose in shuttle wet trash (if available).

√Drink bag restraint bag installed in HUT

- ☐☐☐☐ 60. Remove helmet light batteries; stow
- ☐☐☐☐ 61. Clean PHA Quick Don Masks with dry wipes from EMU Servicing Kit.

EMU OVERNIGHT STOW (10 MINUTES)

NOTE

When shuttle present, minimum EMU hardware (helmet, HUT, LTA, LCVG, and battery only) should be located together to provide easy access for potential return to shuttle during an expedited undock.

- ☐☐☐☐ 62. Stow comm cap in right arm of EMU.
- ☐☐☐☐ 63. Helmet →|← HUT

Install helmet cover.
- ☐☐☐☐ 64. Tether LTA to EDDA.
- ☐☐☐☐ 65. Hang LCVGs, TCUs, other EMU accessories for drying.

NOTE

Do not perform step 66 if Metox regeneration is in progress.

MCC-H/IV
PCS

66. CONFIGURING AIRLOCK CCAA

Airlock: ECLSS: AL1A1 CCAA: CCAA Commands

AL CCAA Commands

'Temperature'

input Temperature Setpoint – 2 5 deg C

cmd Set

√Command Status – Temp Setpoint Complete

HOOK
VELCRO

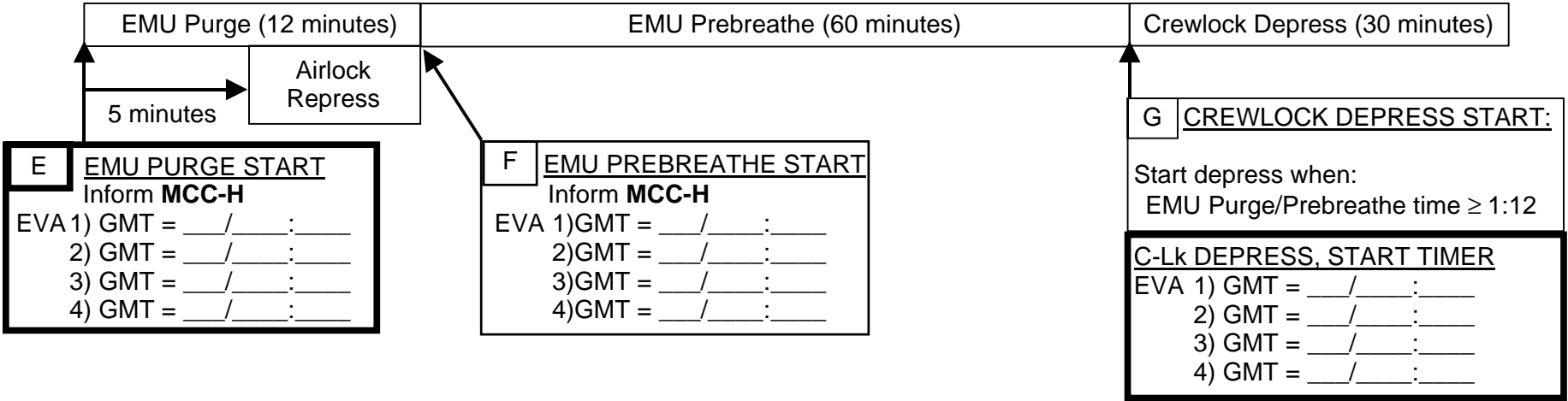
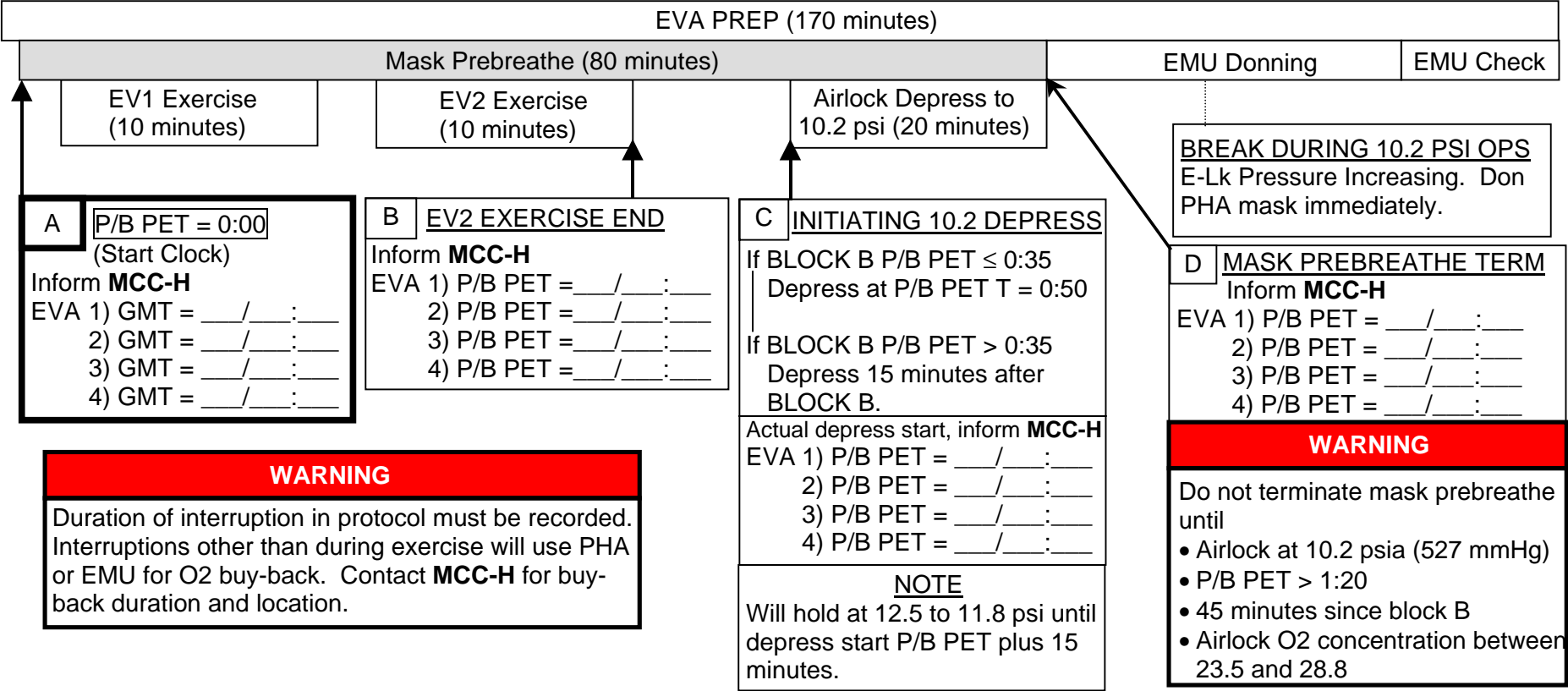
EVA PREBREATHE CUE CARD

(ISS EVA SYS/8A - ALL/FIN 1/Paper on ISS)

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ISS EVA-2a/ALL/E

EVA PREBREATHE EVENTS



HOOK
VELCRO

EVA PREBREATHE CUE CARD
(ISS EVA SYS/8A - ALL/FIN 1/Paper on ISS)

EVA EXERCISE PRESCRIPTION

Start Exercise Protocol	When Exercise Complete
<p>DON EXERCISE EQUIPMENT:</p> <ol style="list-style-type: none">Don Heart Rate Monitor chest strap and synchronize start of exercise with Heart Rate Watch and CEVIS Refer to {CEVIS ON LINE MODE OPERATIONS}, steps 2 and 4.2 to 4.4 (SODF: MED OPS: NOMINAL: CM), then:Configure bungees on CEVIS. <p>IF USING SHUTTLE O2, RECONFIGURE PHA TO 90 FT HOSE:</p> <ol style="list-style-type: none">90-ft hose from shuttle LEH Port→ ← Special Tee Assembly60-ft hose from PBA port ← → Special Tee AssemblyTemporarily stow 60-ft hose for use after CEVIS ops. <p>INITIATE EXERCISE</p> <ol style="list-style-type: none">Perform exercise per prescription below. Synchronize start of Heart Rate Watch with exercise.	<p>TERMINATE EXERCISE</p> <ol style="list-style-type: none">Press STOP on CEVIS display and stop heart rate watch.Record Exercise End PET (For EV2 record in Block B of Prebreathe Events).Momentarily pull mask away from face to verify positive O2 flow. If no O2 flow, contact MCC-H.If all EV crew have completed exercise Cycle ergometer Power Switch → OFF Remove PCMCIA card from CEVIS. Temporarily stow PCMCIA card. <p>DOFF EXERCISE EQUIPMENT</p> <ol style="list-style-type: none">DoFF Heart Rate Monitor chest strap. Clean with alcohol wipes (EMU Servicing Kit) avoiding electrodes.DoFF Ergometer/CEVIS shoes <p>IF USING SHUTTLE O2, RECONFIGURE PHA TO 60 FT HOSE</p> <p>When 5 minutes have elapsed after exercise completion</p> <ol style="list-style-type: none">60-ft hose from PBA port → ← Special Tee Assembly90-ft hose from Shuttle LEH Port ← → Special Tee Assembly

NOTE	
1. Maintain > 60 rpm and match arm/leg cadence (pedaling effort at < 60 rpm becomes noticeably more difficult). Use table values for workload and record heart rate. If heart rate exceeds the maximum indicated at the top of the table, decrease workload by 25-watt increments until heart rate falls below the maximum.	
2. CEVIS timer will not increase while arrows remain displayed. Workload will change as soon as arrows are pressed.	
3. If an interruption of either exercise or mask prebreathe < 2 minutes occurs during the 10-minute exercise, extend the 75 % max VO2 portion of the table for a duration equal to the interruption.	

EXERCISE PRESCRIPTION		EV 1			EV 2			EV 3			EV 4		
		Workload (watts)	Heart Rate (bpm) (Not to exceed = ____)			Workload (watts)	Heart Rate (bpm) (Not to exceed = ____)			Workload (watts)	Heart Rate (bpm) (Not to exceed = ____)		
Time	Max VO2		EVA#1	EVA#2	EVA#3		EVA#1	EVA#2	EVA#3		EVA#1	EVA#2	EVA#3
1 min	37.5 %												
1 min	50 %												
1 min	62.5 %												
7 min	75 %												
1 min	Cooldown												
Exercise End PET			:	:	:		:	:	:		:	:	:

1.305 EQUIPMENT LOCK PREP

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(45 Minutes)

OBJECTIVE:

Prepare Equipment Lock, EMUs, and ancillary hardware to support EVA Prep activities.

DRINK BAG FILL (15 MINUTES)

NOTE

1. Drink bag filling and degassing may take longer than 15 minutes.
2. Drink bag should not be filled over 32 oz. and is only certified to hold noniodinated water for a maximum of 24 hours.

BOTH

1. Fill drink bag (DIDB) from SM or shuttle galley using angled fill tool.
Remove gas from drink bag.
2. Stow fill tool in trash.
3. Temporarily stow drink bag in EMU Equipment Bag.

PREPARING EMU AND BIOMED EQUIPMENT (15 MINUTES)

If loose equipment is stowed in HUT

4. Waist ring ←|→ HUT
5. Remove loose equipment from HUT.
6. Waist ring →|← HUT
7. Stage crew preference items in EMU Equipment Bag as required.
8. Helmet ←|→ HUT
9. Unstow Comm Cap and inspect MBEDs (two) for damage.
Replace MBEDs as required (EMU Servicing Kit).
10. Remove DIDB restraint bag from HUT.
11. Insert drink bag into restraint bag.
Install restraint bag in HUT.
12. Install fresnel lenses, valsava devices, as required.
13. Apply antifog (EMU Servicing Kit) to the following:
Helmet (not Fresnel lens)
EV Glasses
Thoroughly wipe off antifog.
14. Helmet →|← HUT

1.305 EQUIPMENT LOCK PREP

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15. ✓Helmet lights installed on helmet

BSA 16. ✓CHARGE IN PROGRESS LED – Off

Unstow four helmet light batteries.
Install batteries in helmet lights.

17. ✓Helmet light ops

18. ✓EMU TV installed on helmet as required

If required

19. Unstow biomed sternal harness and signal conditioner from EMU Servicing Kit.

20. Install sternal harness in LCVG.

21. Install signal conditioner in LCVG pocket.

22. Sternal harness →|←signal conditioner

23. Reposition EDDA for EMU donning as required.

24. Cuff Checklist →|← EMU

PREPARING PREBREATHE EQUIPMENT (10 MINUTES)

If using Exercise Prebreathe Protocol

EV1, EV2

25. ✓CEVIS configuration in Node/Lab

26. Install prime and backup tubing (blue or black only) on CEVIS.

27. Unstow PCMCIA cards (two), Heart Rate Monitor, and Velcro straps.

E-Lk

Stow PCMCIA cards (two) and Heart Rate Monitor in side pocket of PHA Bag.

28. ✓PHA configuration per Figure 1 or Figure 2 as required

1.305 EQUIPMENT LOCK PREP

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Figure 1.- Prebreathe Hose Assembly (PHA) ISS O2 Use Configuration.

1.305 EQUIPMENT LOCK PREP

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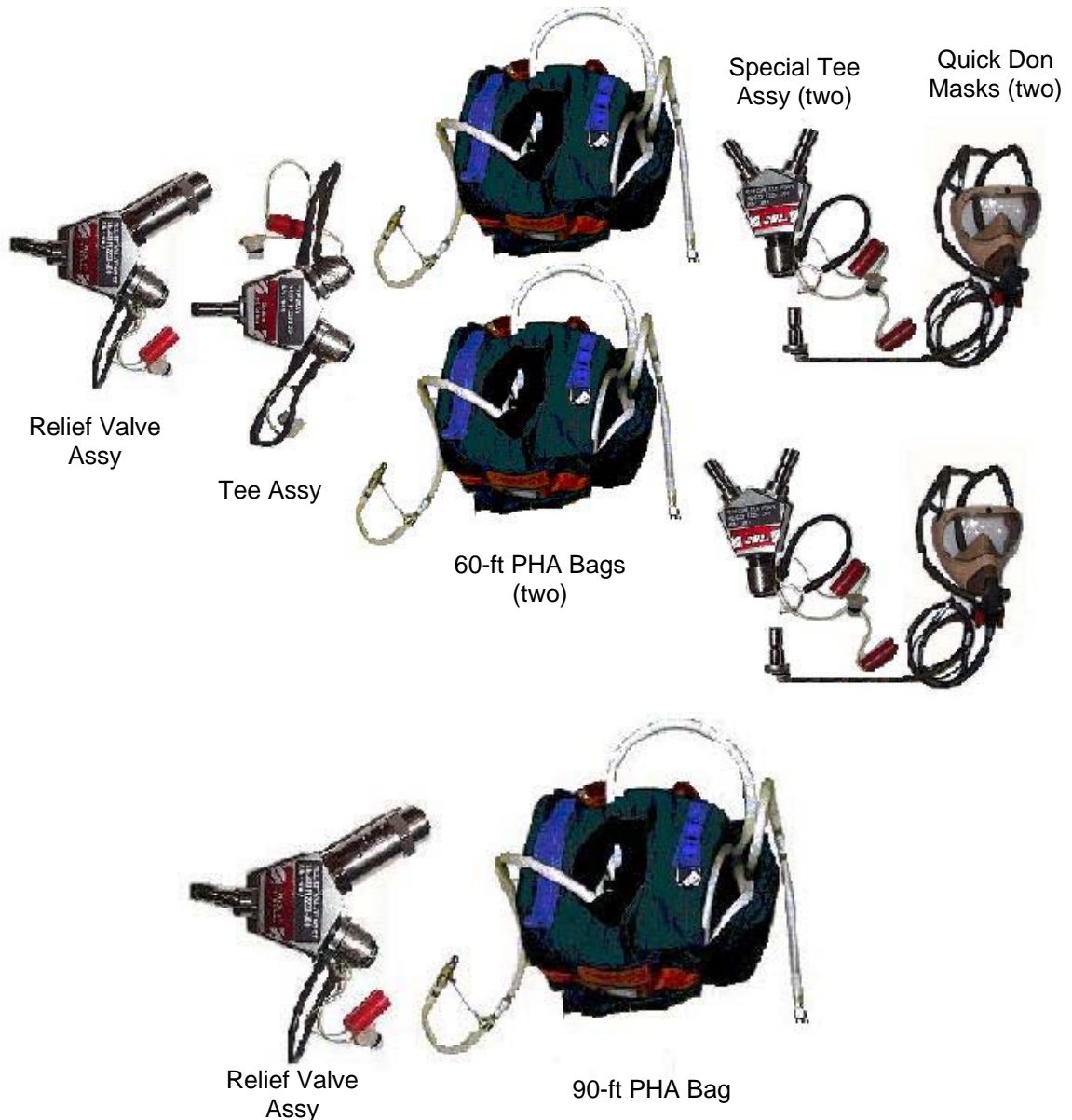


Figure 2.- Prebreathe Hose Assemblies (PHA) Shuttle O2 Use Configuration.

29. Visually inspect three PHAs, PHA Quick Don Masks for any damage.
- BOTH 30. Stow Quick Don Masks and 15 feet of hose in large side pocket of PHA Bags.
- A/L10A1 31. ✓Flexible Ventilation Duct attached to Conditioned Air Supply connection

1.305 EQUIPMENT LOCK PREP

(ISS EVA SYS/7A - ALL/FIN 5/HC/Paper on ISS) Page 5 of 6 pages

VERIFYING EQUIPMENT IN AIRLOCK (5 MINUTES)

32. Confirm the following equipment is located in the Airlock:

- ☐☐☐☐ PFE located in PFE locker
 - √Pressure gauge needle in green zone (800 to 900 psig)
- ☐☐☐☐ PBA Quick Don Masks and bottles for every isolated crewmember
 - √PBA Bottles →|← Quick Don Masks for each non-EVA crewmember in the airlock
 - √Oxygen bottle pressure \geq 3000 psig for each bottle
- ☐☐☐☐ CSA-CPs (two for exercise prebreathe and overnight campout)
 - √Good battery power on both CSA-CPs
- ☐☐☐☐ Two spare regenerated METOX canisters
 - All required EMU components:
 - ☐☐☐☐ HUTS
 - ☐☐☐☐ LTAs
 - ☐☐☐☐ Gloves
 - ☐☐☐☐ Helmets
 - ☐☐☐☐ LCVGs (with biomed)
 - ☐☐☐☐ Comm Caps
 - ☐☐☐☐ Crew preference items
- ☐☐☐☐ Dosimeter
- ☐☐☐☐ EMU Servicing Kit
- ☐☐☐☐ Flashlight
- ☐☐☐☐ Jeweler's Screwdriver (optional)
- ☐☐☐☐ Airlock Tool kit
- ☐☐☐☐ Earplugs
- ☐☐☐☐ Towel
- ☐☐☐☐ Aspirin

1.305 EQUIPMENT LOCK PREP

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WARNING

EV crewmembers should minimize application of hygiene and hydrocarbon-based products prior to EVA day to avoid introduction of irritants and combustibles into the EMU. For acceptable items in EMU, refer to {5.110 APPROVED NON-EMU HARDWARE}, all (SODF: ISS EVA SYS: REFERENCE), as required.

- ☐☐☐☐ Personal Hygiene Items
- ☐☐☐☐ Egg Timers
- ☐☐☐☐ Vacuum Manometer (optional, √**MCC- M** for VM number)

1.307 REBA INSTALLATION/REMOVAL

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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I

(10 Minutes for Installation)

(10 Minutes for Removal)

OBJECTIVE:

Install/remove Rechargeable EVA Battery Assembly (REBA) to/from the back of EMU PLSS.

NOTE

1. Take care when mating/demating EMU Power Harness to avoid damaging pins.
2. Refer to figures below for procedure.

INSTALLATION (10 MINUTES)

1. Unstow REBA, note barcode (serial number).
2. As required, rotate EDDA to access back of EMU.
3. Unzip TMG to access REBA pouch and EMU Power Harness.
4. Remove REBA J1 fabric cover.
5. Install REBA on EMU.
6. Configure REBA pull tabs through slots in TMG.
7. √sw (pulltab) REBA – OFF, toward left arm of suit
8. EMU Power Harness (P1) →|← REBA (J1)
9. Report REBA barcode (serial number) to **MCC-H** as comm permits.
10. Zip TMG closed.
11. Rotate EDDA closed as required.

REMOVAL (10 MINUTES)

12. As required, rotate EDDA to access back of EMU.
13. √sw (pulltab) REBA – OFF
14. EMU Power Harness (P1) ←|→ REBA (J1)
15. Remove REBA from EMU.
16. Install REBA J1 fabric cover.
17. Report REBA barcode (serial number) to **MCC-H** as comm permits.
Stow REBA.
18. Rotate EDDA closed as required.

1.307 REBA INSTALLATION/REMOVAL

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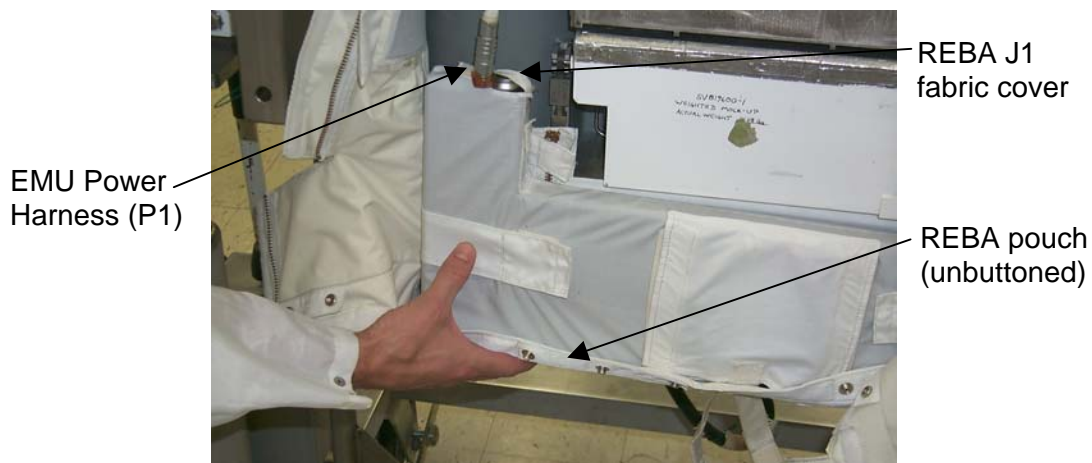


Figure 1.- REBA Installation on PLSS.



Figure 2.- REBA Pulltabs Routed Through TMG Slot.

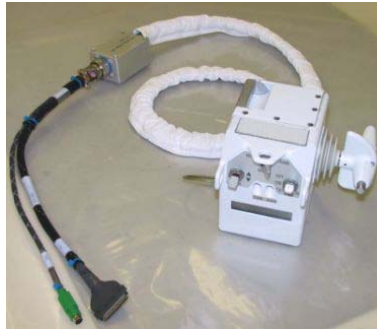
(30 Minutes for Setup)
(30 to 60 Minutes for Training)

OBJECTIVE:

Set up SAFER On-Board Trainer and practice SAFER checkout and rescue operations.

CAUTION

Due to PCMCIA card touch temp concerns, do not use trainer at 527 mmHg (10.2 psia).



HARDWARE UNSTOW

1. Unstow the following:

ITEM	QTY	P/N (S/N)	Location
Ethernet Terminators	2	SED39129319-801	NOD1S4_B2
Ethernet T-connectors	2	SED39129318-801	NOD1S4_B2
3COM PCMCIA Etherlink Network PC Cards with Dongles	2	SDZ39129269-301	Various
Ethernet 10base2 Cable 3 feet (coax)	1	SED39129316-301	Various
SAFER Simulation (Quickflex) PCMCIA card	1	QQ1-030A064V4	CD Library, Vol 1A
SAFER training hand controller (HCM) with Adapter cable	1	SEG33114457-301	AL1D1 CTB 1172
Windows SSC (graphics PC)	1		Various
Linux SSC with RedHat (ROBOT/SAFER) hard drive (sim PC)	1	SDZ39129266-301 (6057)	Hard drive in CD Library, Vol 1A

* If no SSC configured as a Sim PC

* Perform {2.403 THINKPAD HARD DRIVE CHANGEOUT}

* (SODF: POC: NOMINAL) inserting ROBOT/SAFER hard drive

* into sim PC, then:

1.335 SAFER ON-BOARD TRAINING

(ISS EVA SYS/8A - ALL/FIN 3/Paper on ISS)

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2. ✓ 3COM PCMCIA Etherlink Network PC cards installed in both SSCs in bottom slot

SSC CONFIGURATION

NOTE

For proper network connectivity, SSC CONFIGURATION must be complete prior to powering up SSCs.

3. Configure SSCs as illustrated in Figure 1.

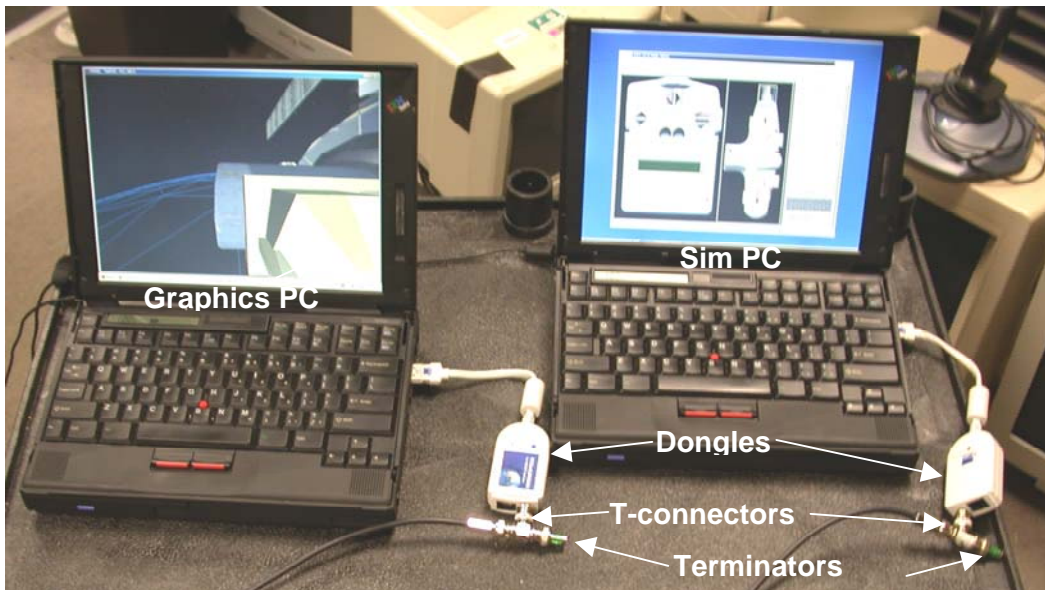


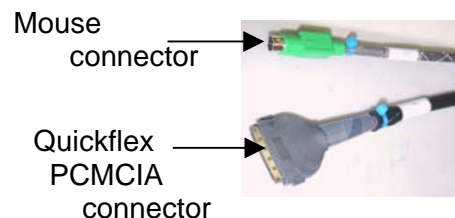
Figure 1.- SSC Configuration.

HCM CONNECTION

- Sim PC
4. Insert SAFER Simulation (Quickflex) PCMCIA card.

5. ✓ Adapter Cable →|← HCM

6. SAFER training hand controller →|← Quickflex PCMCIA card and mouse port



DOUG STARTUP

7. Power up SSCs, if required.

1.335 SAFER ON-BOARD TRAINING

(ISS EVA SYS/8A - ALL/FIN 3/Paper on ISS)

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Graphics PC 8. From desktop, sel Station Apps folder icon.

9. sel DOUG application icon (Doug.exe)

10. SELECTING VISUAL LOAD

Load Select Dialog

sel desired flight load
sel OK

11. SELECTING DISPLAY CONTENT

Select Display Dlg

sel SAFER
sel OK

While DOUG is loading

12. Verify dongle LED (green) – Blinking

When Graphics PC loading complete

Sim PC 13. Log in using SAFER user name and password listed on desktop banner.

14. Verify dongle LED (green) – On, (indicates high network activity)

SELF-RESCUE SIMULATION

15. sel desired scenario
sel separation rate
sel Day or Night

NOTE

1. Only SIM PC SAFER power switch is functional.
2. Any input on the HCM except for power switch throws will make it the active controller for the rest of the run.

HCM 16. √sw MODE – ROT

17. √sw PWR – OFF

SIM PC 18. sel START

When 30 second countdown complete

19. PWR → ON

When rescue complete

20. sel STOP

21. Repeat steps 15 to 20 as required for more training.

1.335 SAFER ON-BOARD TRAINING

(ISS EVA SYS/8A - ALL/FIN 3/Paper on ISS)

Page 4 of 4 pages

SAFER CHECKOUT PRACTICE

Sim PC 22. √PWR – OFF

23. sel START

24. PWR → TST/ON

PWR → ON

PWR → TST/ON

25. Follow instructions displayed on SIM PC SAFER display.

26. PWR → OFF

HARDWARE STOW

When SAFER training complete

27. HCM ←|→ Sim PC (if applicable)

AL1D1

Stow HCM in CTB 1172 (keep adapter cable attached).

28. Power down SSCs.

29. Remove PCMCIA cards and stow network hardware.

30. Go to {2.403 THINKPAD HARD DRIVE CHANGEOUT}
(SODF: POC: NOMINAL) to remove ROBOT/SAFER hard drive from
sim PC.

1.403 REBA POWERED HARDWARE CHECKOUT
(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 1 of 2 pages

(15 Minutes)

OBJECTIVE:

Verify the EMU glove heaters are functional and the EMU TV is receiving power from the Rechargeable EVA Battery Assembly (REBA) prior to EVA.

- EMUs 1. √REBA installed on PLSS
 √sw REBA (pulltab) – OFF

If EMU TV capability

2. Install EMU TV on helmet lights; note camera addresses and serial numbers.
Refer to Figure 1.
3. Record camera addresses and serial numbers for each EMU.

	Camera Addresses	Serial Numbers
EMU 1		
EMU 2		
EMU 3		
EMU 4		

4. Unstow EMU TV power cable.
5. EMU TV power cable ←|→ Ground Plug
6. EMU TV power cable →|← EMU TV

If no EMU TV capability

7. √EMU TV power cable →|← Ground Plug
8. √Upper arm connection, Lower Arm Power Harness →|← SEMU cable
9. √sw Glove heater (one per glove) – OFF
10. Lower Arm Power Harness →|← Gloves

NOTE

To avoid excessive battery consumption and heat buildup, deactivate heaters once heat detected at fingertips.

11. sw REBA (1 per EMU) → ON, pull tab toward right arm of suit
12. sw Glove heater (two per EMU) → ON

When heat detected on all outside fingertips

13. sw Glove heater (two per EMU) → OFF

1.403 REBA POWERED HARDWARE CHECKOUT

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 2 of 2 pages

If EMU TV capability

14. pb EMU TV power → Press

√Green LED – On

15. pb EMU TV power → Press

√Green LED – Off

16. sw REBA (1 per EMU) → OFF, pull tab toward left arm of suit

17. Lower Arm Power Harness ←|→ Gloves

18. Stow lower arm and glove pwr harness connectors under TMG.

19. EMU TV Power Cable ←|→ EMU TV

20. EMU TV Power Cable →|← Ground Plug

21. Stow EMU TV Power Cable.

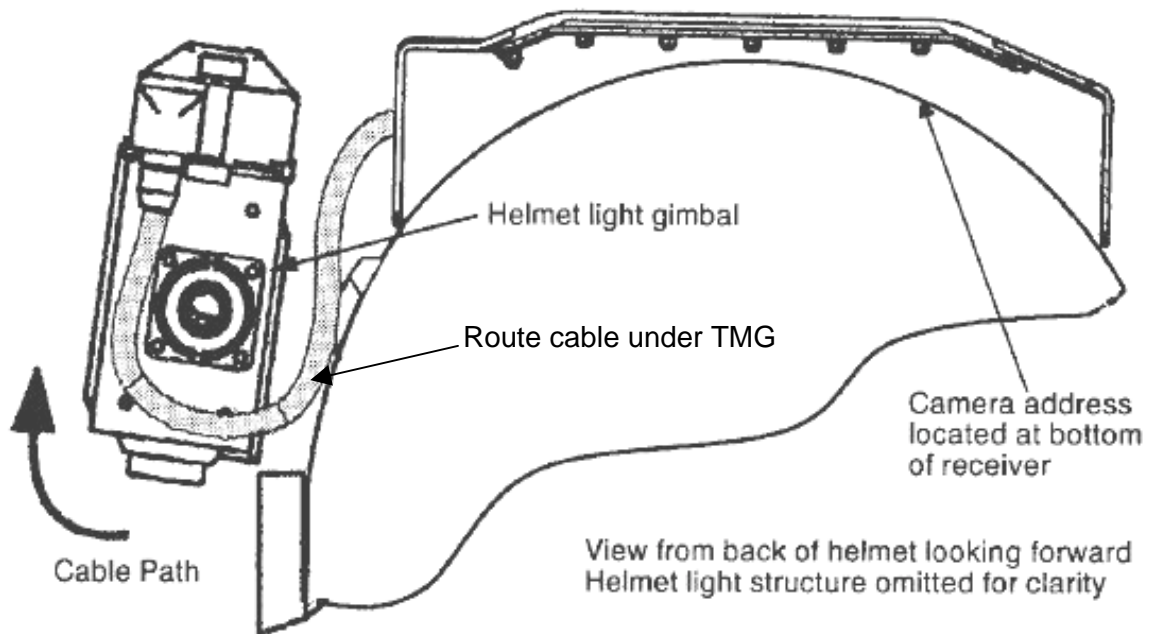


Figure 1.- REBA Connection for EMU TV.

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

Page 1 of 7 pages

(25 Minutes)

(45 Minutes if setting up CWC)

OBJECTIVE:

Recharge EMU feedwater tanks with iodinated water from EMU Water Recharge Bag Payload Water Reservoir (PWR). A small quantity is then dumped from the feedwater tanks to provide ullage for condensate collection during the next EMU prebreathe.

INITIATE (15 MINUTES)

E-Lk 1. Unstow designated EMU Water Recharge Bag (PWR) from floor bin.

CAUTION

PWRs should be inspected for gas bubbles prior to connecting them to the IRU to avoid introducing gas into the EMU feedwater tanks. If a significant quantity of gas is observed, a PWR de-gas may be required.

PWR 2. Unzip restraint bag to access bladder.
Report approximate visual quantity of H₂O and gas bubbles to **MCC-H** as comm permits.
Zip restraint bag closed.

A/L1F2 3. Attach bag to wall below IRU.

IRU 4. EMU Water Recharge Bag →|← H₂O IN Port

5. √H₂O outlet vlv (rotary) – CLOSED

If EMUs not powered

6. POWERING UP EMUS

U1A 6.1 √sw PWR EV-1,2 (two) – OFF
√PWR EV-1,2 LEDs (four) – Off
√EMU O₂ SUPPLY PRESS gauge: < 950

C-Lk wall 6.2 Remove SCU from stowage straps and pouches.
Transfer SCU to E-Lk.

DCM 6.3 Remove DCM cover.
Attach with Velcro to DCM.

6.4 SCU →|← DCM

√SCU locked

6.5 sw POWER → BATT

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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CAUTION

EMU must be on BATT power when UIA suit power is turned on.

PSA

- 6.6 √sw SUIT SELECT (two) – OFF
- √sw EMU MODE EMU1,2 (two) – PWR

- 6.7 sw MAIN POWER → ON

√MAIN POWER LED – On

- 6.8 sw SUIT SELECT (two) → EMU 1,2

√EMU 1,2 LEDs (two) – On

√EMU 1,2 Volts: 18.0 to 19.0

UIA

- 6.9 sw PWR EV-1,2 (two) → ON

√PWR EV-1,2 EMU LEDs (two) – On

DCM

- 6.10 sw POWER → SCU

UIA

- 7. √WATER EV-1,2 REG vlv (two) – SUPPLY

- 8. WATER EV-1,2 SUPPLY vlv (two) → OPEN

If PSA Utility Outlet power being used for other applications

- 9. Contact **MCC-H** for verification of PSA Utility Outlet power loading.

PSA

- 10. sw IRU/UTILITY POWER → ON

√IRU/UTILITY POWER LED – On

√IRU Volts: 27.0 to 29.0

NOTE

1. The following step powers on the IRU.
2. Be prepared to verify the POWER, PRESS, and TEMP LEDs briefly illuminate when IRU POWER is taken ON. As required, notify **MCC-H** of any missing pixels on QUANTITY display.

IRU

- 11. sw POWER → ON

√POWER, PRESS, TEMP LEDs (three) –On (at startup)

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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When 2.5-second LED and pixel check complete

12. √POWER LED remains – On

13. H2O outlet vlv (rotary) ↻ EMU SUPPLY.

14. sw PUMP → ON

√PUMP LED – On (green)

√QUANTITY display – ↑

* If TEMP LED or PRESSURE LED – On (yellow)

* | sw PUMP → OFF

*

* | Contact **MCC-H**.

TERMINATE (10 MINUTES)

DCM

15. √STATUS: H2O WP

IRU

If H2O WP ≤ 12.0 psi and Quantity display not ↑ (bag empty)

15.1 sw PUMP → OFF

15.2 H2O outlet vlv (rotary) ↻ CLOSED

15.3 Record value from IRU Quantity display in Table 1.
Report bag serial number, Quantity, and empty status to
MCC-H as comm permits.

Table 1. Payload Water Reservoir Content

Date	Bag Serial Number	IRU Quantity	Approx. H2O/Gas Content	
			H2O (L)	Gas (mL)

15.4 EMU Water Recharge Bag ←|→ H2O IN Port

Stow in E-lk Floor Bin.

E-lk

15.5 Unstow new designated EMU Water Recharge Bag.

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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IRU	15.6	Unzip restraint bag to access bladder. Report approximate visual quantity of H2O and gas bubbles to MCC-H as comm permits. Zip restraint bag closed.
	15.7	EMU Water Recharge Bag → ← H2O IN Port
	15.8	Go to step 13.
		When H2O WP > 12.0 psi, stable for ~30 seconds (charging complete)
UIA	16.	WATER EV-1,2 SUPPLY vlv (two) → CLOSE
IRU	17.	sw PUMP → OFF √PUMP LED – Off
	18.	H2O outlet vlv (rotary) ↻ CLOSED.
	19.	Record value from Quantity display on Table 1.
	20.	sw POWER → OFF √POWER LED – Off
	21.	EMU Water Recharge Bag ← → H2O IN Port Unzip restraint and inspect bag for water and gas content. Record on Table 1. Zip restraint bag closed.
	22.	Report bag serial number, IRU Quantity, and approximate visual H2O/gas content to MCC-H as comm permits.
A/L1D1	23.	Stow bag in floor bin. Report new stowage location to MCC-H as comm permits.
PSA		If PSA Utility Outlet power not being used for other applications
	24.	sw IRU/UTILITY POWER → OFF √IRU/UTILITY POWER LED – Off

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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Alternate method to dump to a CWC per **MCC-H**.

25. SETTING UP EMU WASTEWATER COLLECTION BAG (20 minutes)

25.1 Unstow the following:

- ☐ CWC s/n ____ with orange label

ISS IVA Toolbox:

- ☐ Ratchet, 3/8" Drive
- ☐ 6" Extension
- ☐ 5/16" Socket, 3/8" Drive

UIA

25.3 Unfasten captive screws (four) on filter access door using ratchet and 5/16" socket with 6" extension.

CAUTION

UIA Filter access door was not designed to handle kickloads while open. Use caution when translating near it.

25.4 Open filter access door.

NOTE

1. As required, use a towel to clean up any residual water.
2. Refer to Figure 1 for UIA Waste biocide filter location and attachment configuration.

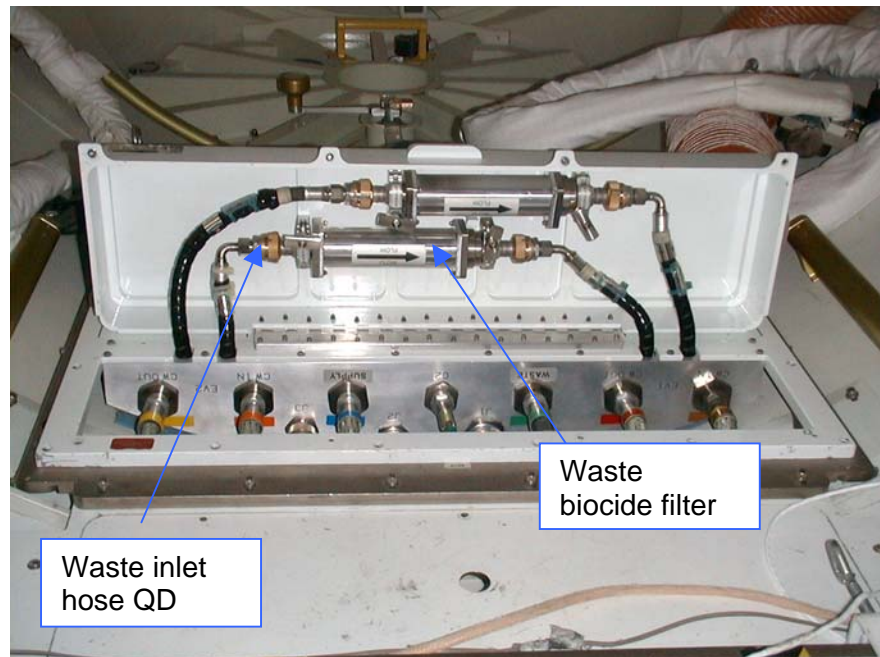


Figure 1.- UIA Filters and Hoses.

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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UIA

25.5 WASTE inlet hose QD ←|→ WASTE biocide filter

25.6 CWC →|← WASTE inlet hose QD

25.7 Perform steps 27 to 33.

25.8 CWC ←|→ WASTE inlet hose QD

25.9 WASTE inlet hose QD →|← WASTE biocide filter

25.10 Close UIA filter access door.

25.11 Fasten captive screws (four) on filter access door using ratchet and 5/16" socket.

25.12 Restow CWC and tools.
Go to step 35.

PCS

26. VERIFYING CONDENSATE TANK CONFIGURATION

Lab: ECLSS: H2O Vent

Lab Water Vent

√Water Vent System Status – Inhibited

If Water Vent System Status – Enabled

√**MCC-H**

√Condensate Tank Qty 1(2) < 42.5 kg

If Condensate Tank Qty 1(2) > 42.5 kg

√**MCC-H**

EMU

27. √Helmet ←|→ HUT

Install SCOF

√SCOF locked

DCM

28. O2 ACT → IV

UIA

29. √WATER EV-1(2) SUPPLY vlv – CLOSE

NOTE

Steps 30 and 31 should be performed serially for EMU 1 and EMU 2.

30. WATER EV-1(2) REG vlv → WASTE

Wait 30 seconds.

1.505 EMU WATER RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

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31. WATER EV-1(2) REG vlv → SUPPLY

32. Repeat steps 30 and 31 for other EMU.

DCM 33. O2 ACT → OFF

34. Verify with **MCC-H** that 0.5 to 1.0 lbm (0.23 to 0.45 kg) per EMU was dumped to condensate tank.

35. Remove SCOF.
Stow SCOF in EMU Equipment Bag.

36. As required per timeline, go to {1.240 POST EVA} (SODF: ISS EVA SYS: EVA PREP/POST).

or

Go to {1.525 LCVG WATER FILL} (SODF: ISS EVA SYS: EMU MAINTENANCE).

or

Go to step 37.

DCM 37. POWERING DOWN EMUS (AS REQUIRED)
37.1 √sw POWER – SCU

UIA 37.2 sw PWR EV-1,2 (two) → OFF

√PWR EV-1,2 LEDs (four) – Off

√PWR EV-1,2 VOLTS: ~ 00.0

37.3 OXYGEN EMU 1,2 vlv (two) → CLOSE

PSA 37.4 sw SUIT SELECT (two) → OFF

√SUIT SELECT LEDs (four) – Off

37.5 sw MAIN POWER → OFF

√MAIN POWER LED – Off

DCM 37.6 SCU ←|→ DCM

37.7 Install DCM cover.

C-lk wall 37.8 Insert SCU in stowage pouch.

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1.510 METOX REGENERATION

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 1 of 4 pages

OBJECTIVE:

Regenerate Metal Oxide (Metox) Canisters by baking out CO₂ in Metox Regenerator Oven.

(10 Minutes for Initiate)

(10 Minutes for Terminate)

(14 Hour Total Regeneration Time)

CAUTION

If air quality anomaly or unusual smell is present, Metox regeneration should not be performed.

1. INITIATE (10 MINUTES)

MCC-H

1.1 Configuring LTL and Airlock CCAA to Support METOX REGEN

1.1.1 To set the desired LTL temperature setpoint to 7.7° C or less as required (8.3° C desired minus 0.6° C measurement error), perform {2.201 LAB IATCS SETPOINT CHANGE}, all (SODF: TCS: NOMINAL: IATCS), then:

1.1.2 For the Airlock CCAA, perform {2.503 CCAA FAN SPEED CHANGE}, steps 1.3 to 1.5 (SODF: ECLSS: NOMINAL: THC), then:

In step 1.4, set the fan speed to 5500 rpm.

In step 1.5, set the temperature to 18° C.

When TCCV position < 13 deg, proceed.

1.1.3 To set the Airlock CCAA fan speed to 3400 rpm, perform {2.503 CCAA FAN SPEED CHANGE}, step 2 (SODF: ECLSS: NOMINAL: THC), then:

1.1.4 C&W Summ

Caution & Warning Summary
'Event Code Tools'

sel Enable

Enable an Event

input Event Code – 6 7 0 3 (AL1A1 CCAA INOPERATIVE-A/L)

cmd Execute

1.2 Open CO₂ Removal Receptacle Door.

CO₂ VALVE → REGEN

CO₂

Removal

Receptacle

1.510 METOX REGENERATION

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 2 of 4 pages

Metox
Regen

1.3 ✓sw POWER – OFF

✓ON LED – Off

1.4 Open regenerator door > 90°.

✓No Metox Canisters stowed in regenerator

If regenerating single Metox Canister

1.5 Install shutoff caps over ports in upper berth (pull out and twist).

1.6 Report Metox Canister barcode and new location to **MCC-H** as comm permits.

Install expended Metox Canister in lower berth per label on Canister.

Go to step 1.8.

1.7 Report Metox Canister barcode and new location to **MCC-H** as comm permits.

Install expended Metox Canisters per label on Canister.

NOTE

The CYCLE switch must be set to START within 15 minutes of closing the regenerator door to avoid resetting the regenerator to the cooldown mode.

1.8 Close regenerator door.

Lock regenerator door handle.

1.9 sw POWER → ON/RESET

Verify all LEDs (19) – On (during startup)

Verify TIME REMAINING display – ↓ (hexidecimally from 'F:FF' to '0:00') and no LCD characters missing

When display countdown and LED check complete

1.10 ✓ON LED – On

✓sw MODE – REGENERATE

✓sw FAULT OVERRIDE – OFF

✓FAULT OVERRIDE ON LED – Off

✓TIME REMAINING display: '0:00'

✓POWER INTERRUPT LED – Off

NOTE

A faint heater-like smell is expected during regeneration.

1.11 sw CYCLE → START

1.510 METOX REGENERATION

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 3 of 4 pages

- * If unusual smell or air quality anomaly during regeneration
- * | sw CYCLE → SHUTDOWN
- *
- * | Contact **MCC-H**.

NOTE

During single Canister regeneration, the UPPER CAN FAULT INDICATOR LED will be illuminated.

1.12 ✓ FAULT INDICATOR LEDs (eight) – Off

If VALVE/DOOR FAULT INDICATOR LED (yellow) – On and TIME REMAINING display: '**E:02**'

1.13 Open regenerator door > 90°.

1.14 Close regenerator door.
Lock regenerator door handle.

1.15 Return to step 1.11.

1.16 ✓ REGENERATE HEATING LED – On

✓ TIME REMAINING display: '**14:00**'

✓ TIME REMAINING display – ↓ (1-minute increments)

1.17 If any unexpected errors or faults occur during regeneration, refer to {2.235 METOX REGENERATOR TROUBLESHOOTING} (SODF: ISS EVA SYS: AIRLOCK CONTINGENCY) and contact **MCC-H**.

2. TERMINATE (10 MINUTES)

When 14 hour regeneration cycle complete or per **MCC-H** instruction:

CAUTION

Metox Canisters should not be left in oven after regeneration.

Metox
Regen

2.1 ✓ REGENERATE COOLING LED – Off

✓ REGENERATE COMPLETE LED – On

✓ TIME REMAINING display: '**0:00**' and no error codes present

✓ OVEN HOT LED – Off

✓ FAULT INDICATOR LEDs (eight) – Off

2.2 Open regenerator door.

2.3 Remove Metox Canister(s).

1.510 METOX REGENERATION

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 4 of 4 pages

NOTE

The regenerator has a known failure mode in which the Metox state indicator may not reset to "R". **MCC** tracks canister status.

2.4 Close regenerator door.

2.5 sw POWER → OFF

2.6 Unstow Metox Canister caps from EMU Equipment Bag.
Install caps on regenerated Canisters.
Stow regenerated Canisters.

2.7 Report Metox Canister barcode and new stowage location to **MCC-H**, as communication permits.

CO2
Removal
Receptacle

2.8 Open CO2 Removal Receptacle Door.

CO2 VALVE → REMOVAL

MCC-H
IV PCS

2.9 Configuring LTL and Airlock CCAA for Nominal Operations
To set the LTL Temperature Setpoint to 11.1° C or less as required, perform {2.201 LAB IATCS SETPOINT CHANGE}, all (SODF: TCS: NOMINAL: IATCS), then:

For the Airlock CCAA to set the Temperature Setpoint to 25° C (or per crew preference), go to {2.501 CABIN TEMPERATURE CONTROL}, all (SODF: ECLSS: NOMINAL: THC).

2.10 Returning C&W to Nominal Configuration
C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Suppress

Suppress an Event

input Event Code – 6 7 0 3 (AL1A1 CCAA INOPERATIVE-A/L)

cmd Arm

cmd Execute

1.525 LCVG WATER FILL

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 1 of 3 pages

(40 Minutes)

OBJECTIVE:

Fill empty LCVGs with water for EMU crewmember cooling.

1. POWERING UP EMUs

If EMUs not powered

- | | | |
|-----------|------|--|
| UIA | 1.1 | √sw PWR EV-1,2 (two) – OFF
√PWR EV-1,2 LEDs (four) – Off
√EMU O2 SUPPLY PRESS gauge: < 950 |
| C-Lk wall | 1.2 | Remove SCU from stowage straps and pouches.
Transfer SCU to E-Lk. |
| DCM | 1.3 | Remove DCM cover.
Velcro to DCM. |
| | 1.4 | SCU → ← DCM

√SCU locked |
| | 1.5 | sw POWER → BATT |
| | | <div style="border: 1px solid black; background-color: yellow; padding: 5px; text-align: center;">CAUTION
EMU must be on BATT power when
UIA suit power is turned on.</div> |
| PSA | 1.6 | √sw SUIT SELECT (two) – OFF
√sw EMU MODE EMU1,2 (two) – PWR |
| | 1.7 | sw MAIN POWER → ON

√MAIN POWER LED – On |
| | 1.8 | sw SUIT SELECT (two) → EMU 1,2

√EMU 1,2 LEDs (two) – On
√EMU 1,2 Volts: 18.0 to 19.0 |
| UIA | 1.9 | sw PWR EV-1,2 (two) → ON

√PWR EV-1,2 EMU LEDs (two) – On |
| DCM | 1.10 | sw POWER → SCU |

FILLING LCVG WITH EMU FEEDWATER (15 MINUTES)

2. Waist Ring ←|→ HUT
Temporarily stow LTA.
Remove Multiple Water Connector cover.

1.525 LCVG WATER FILL

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 2 of 3 pages

3. Dry LCVG →|← Multiple Water Connector

√Multiple Water Connector locked

4. Helmet ←|→ HUT
Temporarily stow helmet.

5. Install SCOF.

DCM

6. Temp control vlv → 7

7. √STATUS: H2O TEMP = ambient

Record H2O TEMP.

EMU	H2O TEMP

8. sw FAN → ON

9. O2 ACT → IV, (expect NO VENT FLOW message, sw DISP → PRO)

10. Wait 30 seconds, then:

10.1 Depress and hold pump priming valve on back of EMU (30 seconds minimum).

10.2 Slowly cycle Temp Control Valve through full range, returning to 7 position.

NOTE

A decrease in H2O TEMP may not be seen if EMU cooling loop was circulating prior to this procedure.

DCM

11. √STATUS: H2O TEMP decrease from step 7

Record H2O TEMP.

EMU	H2O TEMP

12. Verify air bubbles visible and mobile in LCVG lines.
Verify no unusual fan noise present.

1.525 LCVG WATER FILL

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 3 of 3 pages

If no H2O TEMP decrease or no H2O flow detected in LCVG or if an unusual fan noise is present

13. Slowly cycle Temp Control Valve through full range, returning to 7 position.
14. Depress and hold pump priming valve on back of EMU (30 seconds minimum).
15. Repeat steps 13 and 14 during fill as required.

When no air bubbles visible in LCVG lines

- DCM
16. sw FAN → OFF
 17. O2 ACT → OFF

REFILLING EMU FEEDWATER (25 MINUTES)

18. Perform {1.505 EMU WATER RECHARGE}, all (SODF: ISS EVA SYS: EMU MAINTENANCE), then:

- HUT
19. √SCOF removed
Install helmet.
 20. LCVG ←|→ Multiple Water Connector
Stow LCVG in HUT.
Install Multiple Water Connector cover.

21. Waist Ring →|← HUT

22. POWERING DOWN EMUs

When EMU power no longer desired

- DCM
- 22.1 √sw POWER – SCU
- UIA
- 22.2 sw PWR EV-1,2 (two) → OFF
√PWR EV-1,2 LEDs (four) – Off
√PWR EV-1,2 VOLTS: ~ 00.0
 - 22.3 OXYGEN EMU 1,2 vlv (two) → CLOSE
- PSA
- 22.4 sw SUIT SELECT (two) → OFF
√SUIT SELECT LEDs (four) – Off
 - 22.5 sw MAIN POWER → OFF
√MAIN POWER LED – Off
- DCM
- 22.6 SCU ←|→ DCM
 - 22.7 Install DCM cover.
- C-lk wall
- 22.8 Insert SCU in stowage pouch.

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1.605 BSA BATTERY RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

Page 1 of 4 pages

(20 Minutes for Initiate)
(10 Minutes for Terminate)

OBJECTIVE:

Recharge EMU, REBA, Helmet Light (HL), and/or PGT batteries in the Battery Stowage Assembly via the Battery Charger Assembly.

CAUTION

Verify that the GSE protective tape has been removed from the battery connectors before installation in BSA. If found, tape should be discarded.

INITIATE (20 MINUTES)

- BSA
1. Open BSA door.
As required, install or remove EMU, HL, and/or PGT batteries per **MCC-H** direction.
 2. Close BSA door.
- If charging REBA(s)
- E-Lk
- BSA
- EMU1,2
3. Unstow REBA/BSA cable from M0-2 Bag.
 4. REBA/BSA Cable →|← AUX CHARGE PORT
 5. Deploy and demate REBA Jumper Cables.
 6. REBA Jumper Cables (one per REBA) →|← REBA/BSA Cable
- BCA
7. sw MAIN POWER (up to four) → ON
√MAIN POWER LEDs (up to four) – On
 8. Wait 20 seconds until pixel test is complete.
√Display readable and CHARGE column reads:

CH: --
V: ----
A: ----

NOTE

1. Do not activate BC switches when hourglass is displayed.
2. MODE (middle) and DATA (right) switches are not labeled on each BC.

1.605 BSA BATTERY RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

Page 2 of 4 pages

9. sw MODE (up to four) → STOP

```
*****
* If display garbled/blank or 'Look At' message on
* | any display
* |   On affected BC, sw MAIN POWER → OFF
* |
* |   Repeat steps 7 to 9 on affected BC.
*****
```

BCA If charging EMU batteries (BC3 Ch4 and BC4 Ch4)
10. Report voltage(s) to **MCC-H**.

11. VERIFYING INITIAL CHANNEL PROFILE

PCS If PCS available
11.1 Airlock: EVA: Airlock Systems: Battery Charger Assembly
 (BCA)
 BCA

11.2 √Status – No History (for all channels)

BCA If PCS not available
11.3 Toggling sw DATA → HISTORY (six channels per BC)
11.4 Verify '**No History**' displayed for each channel.

BCA 12. sw MODE (up to four) → CHARGE

NOTE

1. BCs will start charging on first populated channel.
2. During EMU battery charge initiation (BC3 Ch4 and BC4 Ch4) voltage values in CHARGE column will read 0.0 for the first 2 to 6 minutes.

13. √Display CHARGE column indicates charging (voltage and amperage values displayed)

BSA 14. √CHARGE IN PROGRESS LED – On

NOTE

Opening the BSA door will stop all battery charging. Interruption of EMU battery charging will reduce the charged capacity.

TERMINATE (10 MINUTES)

When batteries have completed charge or per **MCC-H** instruction

BCA 15. √Display toggling – '**Charged**' and '**Look At**'

1.605 BSA BATTERY RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

Page 3 of 4 pages

Record channels listed in '**Look At**' section on table below.

	BC1	BC2	BC3	BC4
Channels				

NOTE

Do not actuate BC switches when hourglass is displayed.

16. sw MODE (up to four) → STOP

BSA 17. ✓CHARGE IN PROGRESS LED – Off

BCA 18. ✓Display CHARGE column reads

CH: --
V: ----
A: ----

19. Verify channels listed as '**Look at**' were expected per **MCC-H**.

NOTE

Battery chargers may display the following messages for an empty slot:

'Batt circuit open'

'Short circuit error'

'Time-out error'

* If any unexpected '**Look at**' channels

* If PCS available

* PCS Airlock: EVA: Airlock Systems: Battery Charger
Assembly (BCA)

*

BCA

*

* ✓Status – Task Complete (for all channels with
batteries installed)

*

* Report unexpected channel status to **MCC-H**.

*

* If PCS not available

* BCA Toggling sw DATA → HISTORY (all six channels
per BC)

*

* ✓Display – '**Task Completed - OK**' for each
channel charged

*

* Report unexpected messages to **MCC-H**.

1.605 BSA BATTERY RECHARGE

(ISS EVA SYS/7A - ALL/FIN 4/HC/Paper on ISS)

Page 4 of 4 pages

If EMU batteries charged (BC3 Ch4 and BC4 Ch4)

20. Report voltage(s) to **MCC-H**.

BCA 21. sw MAIN POWER (up to four) → OFF

√MAIN POWER LEDs (up to four) – Off

If REBAs were charged

EMU1,2 22. REBA/BSA Cables (two) ←|→ REBA Jumper Cables

23. Mate and stow REBA Jumper Cables.

BSA 24. REBA/BSA Cable ←|→ AUX CHARGE PORT

Stow REBA/BSA Cable in M-02 Bag.

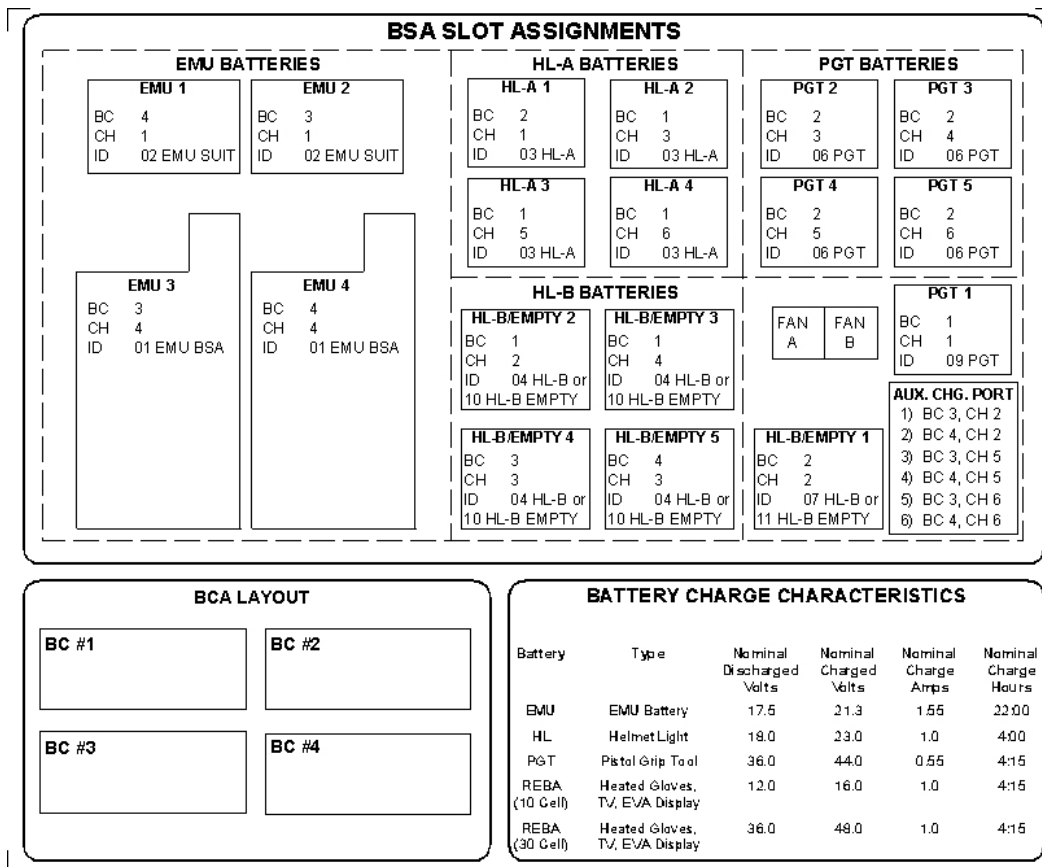


Figure 1.- BSA Door Display (for reference only).

2.105 DISPLAY LOSS DURING POWER TRANSFER (WARM RESTART) I

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 1 of 1 page

(5 Minutes)

OBJECTIVE:

This procedure cycles EMU power while saving nonvolatile RAM in order to reset a locked up DCM display.

UIA If EMU on BATT power and SCU →|← DCM
 1. √sw PWR EV-1(2) – OFF
 √PWR EV-1(2) EMU LED – Off

DCM If EMU on SCU power
 2. sw POWER → BATT

UIA 3. sw PWR EV-1(2) → OFF
 √PWR EV-1(2) EMU LED – Off

WARNING

Fan will be off from steps 4 to 10 during which time CO2 buildup is a concern.

NOTE

Affected EMU will be without comm after step 6. Steps 6 and 7 should be read together before performing step 6.

DCM 4. sw FAN → OFF (expect **FAN SW OFF** message, sw DISP → PRO)

IV 5. Inform affected EV crewmember of impending comm loss.

DCM 6. sw POWER → SCU

Wait 7 seconds

DCM 7. sw POWER → BATT

When 5-second Power Restart complete

8. √Display – **O2 POS – XX**

9. sw FAN → ON (as required)

If display blank or locked up

10. Contact **MCC-H**.

If SCU power desired

UIA 11. √SCU →|← DCM

sw PWR EV-1(2) → ON

√PWR EV-1(2) EMU LED – On

√PWR EV-1(2) VOLTS: 18.0 to 19.0

DCM 12. sw POWER → SCU

13. √Display – **O2 POS – XX**

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2.120 METOX/LIOH REPLACEMENT (MANNED)

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

Page 1 of 2 pages

I

(15 Minutes)

OBJECTIVE:

Remove and replace Lithium Hydroxide (LiOH) or Metal Oxide (Metox) Canister from EMU during manned operations.

IV 1. Unstow new Metox or LiOH Canister.

PLSS 2. Unzip thermal cover.
Affix thermal cover with Velcro to top of EMU.

WARNING

1. Fan will be off during changeout. Perform changeout as quickly as possible.
2. Vent loop is pressurized. Restrain Metox or LiOH canister to avoid injury.

DCM 3. $\sqrt{O_2}$ ACT – IV

4. Helmet purge vlv → op

DCM 5. sw FAN → OFF

IV PLSS 6. Remove expended Metox or LiOH Canister.

If installing LiOH

Holding new Canister with silver plate label facing self

7. Remove caps from new LiOH Canister (left first).

8. Install Canister in EMU (attach Velcro strap).
Latch Canister in place.

If installing Metox

9. Remove caps from new Metox Canister.

10. Install Metox using label on Canister for proper orientation.
Latch Canister in place.

NOTE

EMU may issue **CO2 HIGH** or **MONITOR CO2** message.

DCM 11. sw FAN → ON

12. Helmet purge vlv → cl, locked

DCM 13. O2 ACT → PRESS

2.120 METOX/LIOH REPLACEMENT (MANNED)

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

Page 2 of 2 pages

14. PURGE vlv → op (up)
 15. Begin timing 2-minute purge.
 - IV PLSS 16. Close thermal cover zipper.
 17. Place caps on expended Metox or LiOH Canister.
Temporarily stow Canister.
 18. Report Metox and/or LiOH Canister barcodes and new stowage location to **MCC-H** as comm permits.
- When purge time = 2 minutes
- DCM 19. √STATUS: CO2 < 3.0 mmHg, then:
- PURGE vlv → cl (dn)
20. O2 ACT → IV
- NOTE**

A minimum of 40 minutes of prebreathe is required to condition Metox and LiOH Canisters.
21. Go to {1.225 EMU PREBREATHE}, all (SODF: ISS EVA SYS: EVA PREP/POST) with a minimum of 40-minute prebreathe.

2.125 BATTERY REPLACEMENT (MANNED)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 1 of 3 pages

(15 Minutes)

OBJECTIVE:

Remove and replace a failed or degraded EMU battery during manned operations.

- IV 1. Unstow new EMU battery.
- PLSS 2. Unzip thermal cover.
Velcro thermal cover to top of EMU.

WARNING

1. POWER switch must be in SCU during battery changeout.
2. Fan will be off during changeout. Perform changeout as quickly as possible.

- EV DCM If no SCU power available
3. $\sqrt{O_2}$ ACT – IV
 4. Helmet purge vlv → op
 5. sw FAN → OFF

NOTE

EMU will be without comm after step 6 until battery power is restored at step 15.

- EV DCM 6. sw POWER → SCU
- EV DCM If SCU power available
7. \sqrt{sw} POWER – SCU
 8. $\sqrt{O_2}$ ACT – IV
 9. Helmet purge vlv → op
- DCM 10. sw FAN → OFF

WARNING

Vent loop is pressurized. Restrain Metox or LiOH during battery changeout to avoid injury and to prevent breaking of vent loop seal.

- IV PLSS 11. Unlatch Metox or LiOH canister and rotate it outward.
12. Unlatch and remove used battery.

2.125 BATTERY REPLACEMENT (MANNED)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 2 of 3 pages

13. Install new battery (✓connector alignment).
Engage latch.
14. ✓Metox or LiOH canister seated in vent ports.

Rotate downward until latch pins engage.
Latch canister in place.

- | | | | |
|------|-----|---------------------------|---|
| EV | DCM | If no SCU power available | 15. sw POWER → BATT |
| EV | | | 16. sw FAN → ON |
| | | | 17. Helmet purge vlv → cl, locked |
| | DCM | | 18. ✓STATUS: BATT VDC |
| IV | | | 19. Report the following to MCC-H as comm permits:
Old battery barcode and stowage location
New battery barcode and BATT VDC reading |
| PLSS | | | 20. Close thermal cover zipper. |

NOTE

The EMU calculated TIME EV and TIME LF do not reset despite the battery changeout. A cold restart is required to reset those parameters.

If required per **MCC-H**

21. COLD RESTART OF EMU CWS

WARNING

Fan and O2 will be OFF during restart.
Perform as quickly as possible.

- | | | |
|----|-----|-------------------|
| EV | DCM | 21.1 sw FAN → OFF |
| | | 21.2 O2 ACT → OFF |

NOTE

If SCU power not available, EMU will be without comm between steps 21.3 and 21.4.

- 21.3 sw POWER → BATT(SCU), wait 2 seconds.
- 21.4 sw POWER → SCU(BATT)
- 21.5 sw FAN → ON
- 21.6 O2 ACT → IV

2.125 BATTERY REPLACEMENT (MANNED)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 3 of 3 pages

- | | | | |
|----|-----|--|--|
| EV | DCM | | If Metox or LiOH canister seal was broken during changeout |
| | | | 22. O2 ACT → PRESS |
| | | | 23. PURGE vlv → op (up) |
| | | | 24. Begin 2-minute purge. |
| | | | When purge time = 2 minutes |
| | | | 25. PURGE vlv → cl (dn) |
| | | | 26. O2 ACT → IV |
| | | | 27. Go to {1.225 EMU PREBREATHE} (SODF: ISS EVA SYS: EVA PREP/POST). |

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2.140 EMU COLD RESTART (MANNED)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 1 of 1 page

I

(5 Minutes)

OBJECTIVE:

Reset EMU caution and warning system by clearing nonvolatile RAM.

WARNING

This procedure should be used only at airlock pressures of 8.0 psia and higher. Fan and O2 will be off during restart. Perform restart as quickly as possible.

- DCM
1. sw FAN → OFF
 2. O2 ACT → OFF
 - If POWER – SCU
 3. sw POWER → BATT
 - Wait 2 seconds.
 4. sw POWER → SCU
 - If POWER – BATT
 5. sw POWER → SCU
 - Wait 2 seconds.
 6. sw POWER → BATT
 7. O2 ACT → IV
 8. sw FAN → ON

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2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 1 of 6 pages

I

(75 Minutes with Hatch inspection)
(55 Minutes without Hatch inspection)

OBJECTIVE:

This procedure provides the crew with the necessary steps to safe the Airlock in the event that the Crewlock fails its 5 psi leak check upon Repress. A small leak is defined as one that can be supported by consumables to allow for EV crew to ingress the Equipment Lock and perform safing activities at a habitable pressure.

NOTE

Steps 1 to 20 depress the Crewlock to vacuum and have the EV crew reopen the EV Hatch to check if there is debris that was caught in the hatch when it was closed. Steps 1 to 20 can be performed only if time and consumables permit.

1. √**MCC-H** that time and consumables permit Steps 1 to 20 to be performed

DEPRESS CREWLOCK AND INSPECT EV HATCH SEALS (20 MINUTES)

DCM

2. √SCU →|← DCM

3. √STATUS: SUIT P 4.2 to 4.4

Compare with gauge.

4. O2 ACT → EVA (expect SET O2 PRESS msg)
sw DISP → PRO

IV PCS

5. Airlock: ECLSS: PCA: VRIV
AL PCA VRIV
'Open'

cmd Arm (√Status – Armed)
cmd Open (√Position – Open)

IV A/L1A2

6. Emergency MPEV → Open

Monitor Suit P gauge < 5.5.

* If gauge ≥ 5.5, stop depress, √**MCC-H**.

7. ACTIVATING DEPRESS PUMP

MCC-H/IV
PCS

- 7.1 Airlock: ECLSS: Depress Pump: RPCM AL1A4A A RPC 01
RPCM AL1A4A A RPC 01

√Close Cmd – Ena

cmd RPC Position – Close (√Position – Closed)

2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 2 of 6 pages

- EV UIA 7.2 \sqrt DEPRESS PUMP ENABLE LED – On
- sw DEPRESS PUMP PWR → ON
- Wait 10 seconds for startup.
- C-lk 7.3 DEPRESS PUMP MAN ISOV → OPEN
- When C-Lk at 2.0 psia (103 mmHg)
8. DEPRESS PUMP MAN ISOV → CLOSED
9. sw DEPRESS PUMP PWR → OFF
- EV DCM 10. When C-Lk dP/dT ~0, EV expect alert tone
- When EV Hatch $\Delta P < 0.5$ psi (26 mm Hg)
- EV C-Lk 11. EV Hatch → open
- Inspect EV Hatch Seals.
Remove any debris that is present.
- IV A/L1A2 12. Emergency MPEV → Closed
- PCS 13. Airlock: ECLSS: PCA: VRIV
- AL PCA VRIV
- ‘Close’
- cmd** Close (\sqrt Position – Closed)
- [REPRESSING CREWLOCK \(10 MINUTES\)](#)
- EV C-Lk 14. \sqrt Thermal cover – closed
- EV Hatch → close, lock
- DCM 15. O2 ACT → PRESS
- IV E-Lk 16. IV Hatch equalization valve → throttle OFF to NORM (as required,
EV expect alert tone)
- BOTH DCM 17. C-Lk at 4.0, EV expect alert tone
- When C-Lk at 5.0 (259 mm Hg)
- IV C-Lk 18. IV Hatch equalization valve → OFF (EV expect alert tone)
- Wait 30 seconds for pressure stabilization.
19. \sqrt C-Lk pressure integrity (2 minutes, $\Delta P \leq 0.1$ psi)

2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 3 of 6 pages

If leak check passed

20. Go to CREWLOCK REPRESS {CREWLOCK DEPRESS/REPRESS CUE CARD}, steps 8 to 11 (SODF: ISS EVA SYS: EVA PREP/POST).

- C-Lk 21. IV Hatch equalization vlv → throttle OFF to NORM (EMER)
(as required, EV expect alert tone)

WARNING

1. If Cuff 1 symptoms resolving upon repress, report as Cuff 2.
2. If any DCS, leave O2 ACT – PRESS.

- BOTH DCM When C-Lk P > 5.0 psia
22. O2 ACT → IV

23. When C-Lk dP/dT ~0 (EV expect alert tone)

CAUTION

Verify EV crew is clear of Hatch mechanism.

EV CREW SAFING (15 MINUTES)

- IV PCS 24. Airlock: ECLSS:
Airlock: ECLSS
'Equipment Lock'

Monitor dP/dT

- IV When dP/dT < 0.10 mmHg/min
25. Open IV Hatch per decal.

26. IV Hatch equalization valve → OFF

- BOTH 27. EV crew ingress E-Lk.

- DCM 28. O2 ACT → OFF

29. PURGE vlv → op (up)

30. √sw COMM mode – HL

- IV 31. Install WATER sw guards (two).

32. √Glove heater switch (two) – OFF

2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 4 of 6 pages

If EMU TV capability

33. pb EMU TV power → OFF

√EMU TV POWER LED (green) – Off

PLSS 34. sw REBA → OFF (toward left arm of suit)

35. Lower arm cables ←|→ gloves

Stow lower arm and glove cable connectors under TMG.

If EMU TV capability

36. EMU TV power cable ←|→ EMU TV

EMU TV power cable →|← ground plug

DCM 37. √STATUS: SUIT P < 0.4 (compare with gauge)

Gloves ←|→ EMU

Stow gloves in EMU Equipment Bag.

38. Helmet ←|→ EMU

Temporarily stow helmet.

39. Doff Comm Cap, disconnect from electrical harness.
Stow in EMU Equipment Bag.

NOTE

EV crew will be without SCU cooling while
IV performs SCU removal steps.

DCM 40. sw FAN → OFF

UIA 41. sw PWR EV-1,2 (two) → OFF

√PWR EV-1,2 LEDs (four) – Off

PSA 42. sw SUIT SELECT (two) → OFF

√SUITS SELECT LEDs (four) – Off

43. sw MAIN POWER → OFF

√MAIN POWER LED – Off

EACP 44. sw PWR → OFF

2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 5 of 6 pages

BOTH DCM 45. SCU ←|→ DCM

Install DCM Cover.

REMOVING SCU AND TOOLS FROM CREWLOCK (30 MINUTES)

IV C-Lk 46. Unstow from C-Lk IV Bag:
7/16" Socket with 6" extension (in socket caddy)
EVA Ratchet

UIA 47. √WATER SUPPLY EV-1, 2 vlv (two) – CLOSE
√OSCA – O2 CLOSED (O2 3AKP)

PCS 48. CLOSING AIRLOCK O2 HI PRESSURE SUPPLY VALVE
Airlock: ECLSS: O2 Hi P Supply Vlv
AL O2 Hi Pressure Supply Valve

cmd Close (√Actual Position – Closed)

NOTE

Removal of ОРЛАН caps is technique sensitive. For removal instructions, the cap is pushed inward and rotate clockwise (opposite the displayed arrow) 1/8 turn; then, the cap is pulled outward. Refer to Figure 1.



Figure 1.- OSCA and ОРЛАН Caps.

UIA 49. ОРЛАН-I (II) cap 2 ←|→ OSCA
ОРЛАН-I (II) cap 3 ←|→ OSCA

OSCA ↻ PRESS (НАДДУВ)

2.205 CREWLOCK SMALL LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 6 of 6 pages

50. √OXYGEN EMU 1,2 vlv (two) – OPEN

NOTE

The next step will depressurize the SCU and UIA supply lines via the OSCA prior to removal of the SCU.

51. OXYGEN ORLAN vlv → OPEN

When purge no longer audible

52. √EMU O2 SUPPLY PRESS gauge \cong 0
√ORLAN O2 SUPPLY PRESS gauge \cong 0

53. OSCA ↺ O2 CLOSED (O2 3AKP)

ОРЛАН-I (II) cap 2 → | ← OSCA
ОРЛАН-I (II) cap 3 → | ← OSCA

54. OXYGEN EMU 1,2 vlv (two) → CLOSE

55. OXYGEN ORLAN vlv → CLOSE

C-Lk 56. Remove SCU from stowage straps on C-Lk wall.

UIA 57. SCU ←|→ UIA (by turning SCU Mating bolts (two) ↺ using Ratchet with 7/16" Socket (~15 turns each))

58. Strain relief hooks (two) ←|→ tether points (two) on C-Lk wall

59. √DEPRESS PUMP MAN ISOV – CLOSED

60. Remove stowage pouches from C-Lk restraint straps (leave DCM connectors inside pouches).

61. Transfer to E-Lk from C-Lk
SCUs (with pouches)
Crewlock EVA Bags (four)
IV Bag
Staging Bag
All additional EVA tools

E-Lk 62. Close IV Hatch per decal.
√IV Hatch equalization valve – OFF

63. Install IV Hatch equalization valve cap.

ALL 64. Go to {1.240 POST EVA}, all (SODF: ISS EVA SYS: EVA PREP/POST).

√MCC-H for deltas

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 1 of 12 pages

I

OBJECTIVE:

Depress the Airlock to 10.2 psia in order to resolve an EMU configuration problem and avoid an unrecoverable break in prebreathe protocol.

NOTE

MCC-H will perform steps 1 to 6 from the ground.

1. CONFIGURING MCA FOR AIRLOCK SAMPLING

PCS

1.1 US Lab: ECLSS: AR Rack: MCA: Nominal Cmds

Lab MCA Nominal Commands

√State – Operate (Standby)

If State not Operate (Standby)
Go to step 2.

1.2 'Rapid Sampling'

cmd Airlock

√State – Standby, Operate

NOTE

Once the MCA is rapid sampling, it will take approximately 6 minutes to purge the lines. Airlock constituent data is not accurate until this purge is complete.

1.3 US Lab: ECLSS: AR Rack: MCA

LAB MCA

'(ORU 2) Mass Spectrometer Assembly'

√Sample Time – updating 10 seconds

√Sample Location – Airlock

1.4 C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Inhibit

Inhibit an Event

input Event Code – 6 4 6 1 (MCA ppO2 Approaching Limits)

cmd Arm

cmd Execute

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 2 of 12 pages

2. VERIFYING OXYGEN AND NITROGEN SYSTEM

PCS

2.1 Airlock: ECLSS: Oxygen System

'O2 Hi Pressure Supply Valve'

√Actual Position – Open

'High Pressure'

√UIA Supply Press: 5343 to 6308 kPa (775 to 915 psia)

2.2 'O2 Low Pressure Supply Valve'

√Actual Position – Open

'Low Pressure'

√PCA O2 Line Press: 689 to 930 kPa (100 to 135 psia)

2.3 Airlock: ECLSS: Nitrogen System

'N2 Supply Valve'

√Actual Position – Open

√PCA N2 Line Press: 689 to 930 kPa (100 to 135 psia)

3. CONFIGURING C&W FOR ACS CAMPOUT MODE

PCS

3.1 C&W Summ

'Event Code Tools'

sel Inhibit

input Event Code – 6 3 5 6 (Cabin Pressure Above Normal-E/L)

cmd Arm

cmd Execute

input Event Code – 6 5 7 6 (Rapid Depress-A/L)

cmd Arm

cmd Execute

3.2 sel Enable

input Event Code – 5 9 1 2 (Cabin SD Fail-A/L)

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 3 of 12 pages

cmd Execute

input Event Code – 6 5 3 7 (Cabin SD Lens Contamination-A/L)

cmd Execute

input Event Code – 6 5 3 9 (Cabin SD Active BIT Fail-A/L)

cmd Execute

NOTE

Upon IMV Fan deactivation, rpm sensor registers 0 volts. MDM conversion translates 0 volts (0 counts) to 7164 ± 50 rpm.

4. TERMINATING AIRLOCK IMV

PCS

4.1 Node 1: ECLSS: IMV Stbd Aft Fan

Node 1 IMV Stbd Aft Fan

'Off'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)

cmd Off ($\sqrt{\text{State}}$ – Off)

$\sqrt{\text{Speed}}$, rpm: $\sim 7164 \pm 50$

4.2 Node 1: ECLSS: IMV Stbd Aft Valve

Node 1 IMV Stbd Aft Vlv

$\sqrt{\text{State}}$ – Enabled

'Close'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)

cmd Close

Wait 15 seconds.

$\sqrt{\text{Position}}$ – Closed

4.3 Node 1: ECLSS: IMV Stbd Fwd Valve

Node 1 IMV Stbd Fwd Vlv

$\sqrt{\text{State}}$ – Enabled

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 4 of 12 pages

If Position – Open

‘Close’

cmd Arm (√Status – Armed)

cmd Close

Wait 15 seconds.

√Position – Closed

4.4 Airlock: ECLSS: Duct SD

AL Duct Smoke Detector

‘Monitoring’

cmd Inhibit

√Status – Inhibited

5. INITIATING ACS CAMPOUT (10.2 psia) MODE

PCS

5.1 Airlock: ECLSS: PCA: Global ACS Commands

Global ACS Commands

‘LAB ACS’

√Auto Pressure/Composition Control – Monitor

‘Airlock ACS’

√Auto Pressure/Composition Control – Monitor

‘Campout’

cmd Initiate

NOTE

The Airlock PCA NIV may open when Campout is initiated due to a change in the gas introduction limits. It will close when the Airlock Auto Pressure/Composition Control is inhibited.

5.2 ‘ACS Primary PCA’

√Primary PCA – LAB/Airlock

‘Airlock ACS’

If Auto Pressure/Composition Control – Comp Control

cmd Inhibit (√ – Monitor)

‘LAB ACS’

If Auto Pressure/Composition Control – Comp Control

cmd Inhibit (√ – Monitor)

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 5 of 12 pages

5.3 Airlock: ECLSS: PCA

AL ACS

√ACS Campout Status – Campout

sel N2 Intro Valve

AL PCA N2 Intro Valve

√Position – Closed

6. INHIBITING AIRLOCK RAPID DEPRESS RESPONSE

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'Airlock Depress Response – INT MDM'

cmd Inhibit – Arm (√Status – Armed)

cmd Inhibit

√Airlock Depress Response-INT MDM Status – Inhibited

7. VERIFYING AIRLOCK EQUIPMENT

7.1 Verify PBA Bottles and Masks located in Airlock for every isolated crewmember.

Verify PBA Bottles →|← Masks for each non-EVA crewmember in the Airlock.

Verify Oxygen Bottle pressure gauge needle ≥ 3000 psig for each Bottle.

7.2 Verify two CSA-CPs located in Airlock.
Verify Battery power for both CSA-CPs.

8. ACTIVATING AIRLOCK CO2 REMOVAL (as required)

8.1 Unstow Metox Canisters (two) used previously.

8.2 Remove caps from Metox Canisters.

8.3 Stow caps in EMU Equipment Bag.

A/L1A1 8.4 Rotate EDDA open.

8.5 Report Metox Canister barcodes to **MCC-H**.

8.6 Open CO2 Removal Receptacle door.

8.7 √CO2 VALVE – REMOVAL

8.8 Install Metox Canisters in CO2 Removal Receptacle per label on closeout.

8.9 Close and latch CO2 Removal Receptacle door.

8.10 Rotate EDDA closed.

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

(ISS EVA SYS/9A - ALL/FIN 2/SPN/Paper on ISS) Page 6 of 12 pages

9. CLOSING NODE 1 STBD HATCH

NOTE

Be prepared to initiate depress within 5 minutes of closing the Node 1 Stbd Hatch to prevent high O2 concentrations in the Airlock.

9.1 ✓ **MCC-H** for Go to continue

9.2 ✓ Node 1 Stbd Hatch MPEV – CLOSED and uncapped

9.3 Check Hatch seal and close Node 1 Stbd Hatch per decal (omit last step of decal).

10. DEPRESSING TO 10.2 PSIA

UIA

10.1 ✓ DEPRESS PUMP ENABLE LED – On

10.2 sw DEPRESS PUMP PWR → ON

Wait 10 seconds.

C-Lk

DEPRESS PUMP MAN ISOV → OPEN

PCS

Airlock: ECLSS

Airlock: ECLSS
'Equipment Lock'

10.3 ✓ Cab Press – decreasing

When Cab Press < 14.1 psia (729 mmHg) or **On MCC-H GO**

10.4 Turn Hatch handle in the UNLATCH direction approximately 1.5 turns to place the Hatch in the equalize position (orange stripe).

10.5 Crank Handle – Stowed Position

NOTE

1. CSA-CP % O2 will read approximately 1 % lower than actual during depress. Stable Airlock pressure is needed to obtain an accurate reading.
2. Per SPN 2563 (12A to 20A), each MCA partial pressure reading of the Airlock will be 86 seconds old before the depress begins, and will increase up to 99 seconds old at 10.2 psia.

10.6 Continue depress to 12.5 psia (646 mmHg).
Refer to Figure 1.
Monitor using CSA-CP during depress.

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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- When Airlock is at 12.5 psia (646 mmHg)
- C-Lk 10.7 DEPRESS PUMP MAN ISOV → CLOSED
- 10.8 Verify O₂ is greater than 24.5 %
- DCM If O₂ < 24.5 %
- 10.9 PURGE vlv → op (up) until O₂ > 24.5 %, then:
- 10.10 PURGE vlv → cl (dn)
- C-Lk 10.11 DEPRESS PUMP MAN ISOV → OPEN
- 10.12 Continue depress to 10.2 psia (527 mmHg).
Refer to Figure 1.
- C-Lk 10.13 DEPRESS PUMP MAN ISOV → CLOSED
- 10.14 Verify O₂ is between 23.5 % and 28.8 %.
- UIA 10.15 sw DEPRESS PUMP PWR → OFF

NOTE

MCC-H will perform step 11 from the ground.

11. ENABLING AIRLOCK RAPID DEPRESS RESPONSE AND ALARM

- PCS 11.1 Airlock: ECLSS
- Airlock: ECLSS
- 'Equipment Lock'
- Wait until $|dP/dT| < 0.04$ mmHg/min.
- 11.2 Rapid Depress: Rapid Depress Response Software Control
- US Rapid Depress Response Software Control
- 'Airlock Depress Response – INT MDM'
- cmd Enable**
- ✓Airlock Depress Response – INT MDM Status – Enabled
- 11.3 C&W Summ
- Caution & Warning Summary
- 'Event Code Tools'
- sel Enable
- Enable an Event
- input Event Code – 6 5 7 6 (Rapid Depress-A/L)
- cmd Execute**

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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12. DEPRESSURIZING AFFECTED EMU

DCM

12.1 O2 ACT → OFF

12.2 PURGE vlv → op (up)

12.3 sw REBA → OFF (toward left arm of suit)

If EMU TV already configured

12.4 pb EMU TV power → OFF

√EMU TV POWER LED (green) – Off

PLSS

12.5 EMU TV power cable ←|→ EMU TV
EMU TV power cable →|← ground plug

12.6 Lower arm cables ←|→ gloves
Stow lower arm and glove cable connectors under TMG.

DCM

12.7 √STATUS: SUIT P < 0.4 (compare with gauge)

Gloves ←|→ EMU

Stow gloves in EMU Equipment Bag.

12.8 Helmet ←|→ EMU
Temporarily stow helmet.

DCM

12.9 sw FAN → OFF

12.10 Doff other EMU components as needed.

13. MAINTAINING SUFFICIENT PPO2

If O2 concentration drops below 24 %, on unaffected EMU

DCM

13.1 PURGE vlv → op (up)

When O2 concentration approximately 24.5 %

DCM

13.2 PURGE vlv → cl (dn)

14. RECONFIGURING AFFECTED EMU

When EMU problem resolved, perform the following as required

14.1 √Suit arms aligned

14.2 √Gloves ←|→ EMU
√Wrist disconnects – op

14.3 Don thumb loops.

14.4 √Drink vlv position

14.5 √Biomed connector is outside of HUT.

14.6 Don HUT.

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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- 14.7 Release thumb loops.
- 14.8 ✓Suit arms aligned
- 14.9 Don EV glasses as required.
Don comm cap.
- 14.10 ✓Comm
- 14.11 Biomed pigtail →|← electrical harness
- 14.12 LCVG →|← Multiple Water Connector
✓Multiple Water Connector locked
- 14.13 ✓Thermal cover clear of waist ring
- 14.14 Waist ring → engage position
- 14.15 Waist ring →|← HUT
✓Waist ring locked
- 14.16 Remove donning handles.
Stow donning handles in EMU Equipment Bag.
- 14.17 Cover waist ring.
- 14.18 ✓Drink vlv position
- 14.19 ✓Mic boom position
- 14.20 Don comfort gloves, wristlets.
- 14.21 Wrist rings → engage position
- 14.22 Don EV gloves.
✓EV gloves locked
- 14.23 Tighten palm restraint straps.
- 14.24 ✓sw Glove heater (two) – OFF
- 14.25 ✓sw REBA – OFF (toward left arm of suit)
- 14.26 Lower arm power harness cables →|← Gloves
Stow slack under arm TMG.

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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- 14.27 ✓Cuff C/L position
✓Wrist mirrors installed
- CAUTION**
Minimize fan operation with O2 ACT – OFF (~2 minutes).
- DCM 14.28 sw FAN → ON
- 14.29 ✓Electrical harness clear of neck ring
- 14.30 Don helmet.
✓Helmet locked
- DCM 14.31 O2 ACT → IV
- 14.32 ✓Helmet purge vlv – cl, locked
- DCM 14.33 PURGE vlv → cl (dn)
- If EMU TV capability
- 14.34 Unstow EMU TV power cable.
- 14.35 EMU TV power cable ←|→ Ground plug
- 14.36 EMU TV power cable →|← EMU TV

EMU CHECK (5 MINUTES) FOR AFFECTED EMU

15. ✓Cooling

* If cooling insufficient

* | Slowly cycle Temp control vlv between 7 and Max C

* | while IV depress and hold pump priming valve on

* | back of EMU (30 seconds minimum).

DCM 16. Temp control vlv → as required

17. ✓Wrist rings – covered
✓Waist rings – covered
✓sw WATER – OFF
✓sw POWER – SCU
✓sw FAN – ON
✓sw Comm FREQ – LOW
✓Helmet purge vlv – cl, locked
- DCM ✓PURGE vlv – cl (dn)

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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NOTE

During leak check, when SET O2 IV message is displayed, wait 30 seconds and $\sqrt{\text{SUIT P}}$ gauge stable (4.2 to 4.4) before moving O2 ACT \rightarrow IV.

18. sw DISP \rightarrow STATUS, until LEAK CHECK? displayed
sw DISP \rightarrow YES (Follow displayed instructions).
19. Contact **MCC-H** to obtain total EMU Prebreathe time.
20. For affected EMU, go to {1.220 EMU PURGE} (SODF: ISS EVA SYS: EVA PREP/POST).

2.217 CONTINGENCY AIRLOCK DEPRESS TO 10.2 PSIA

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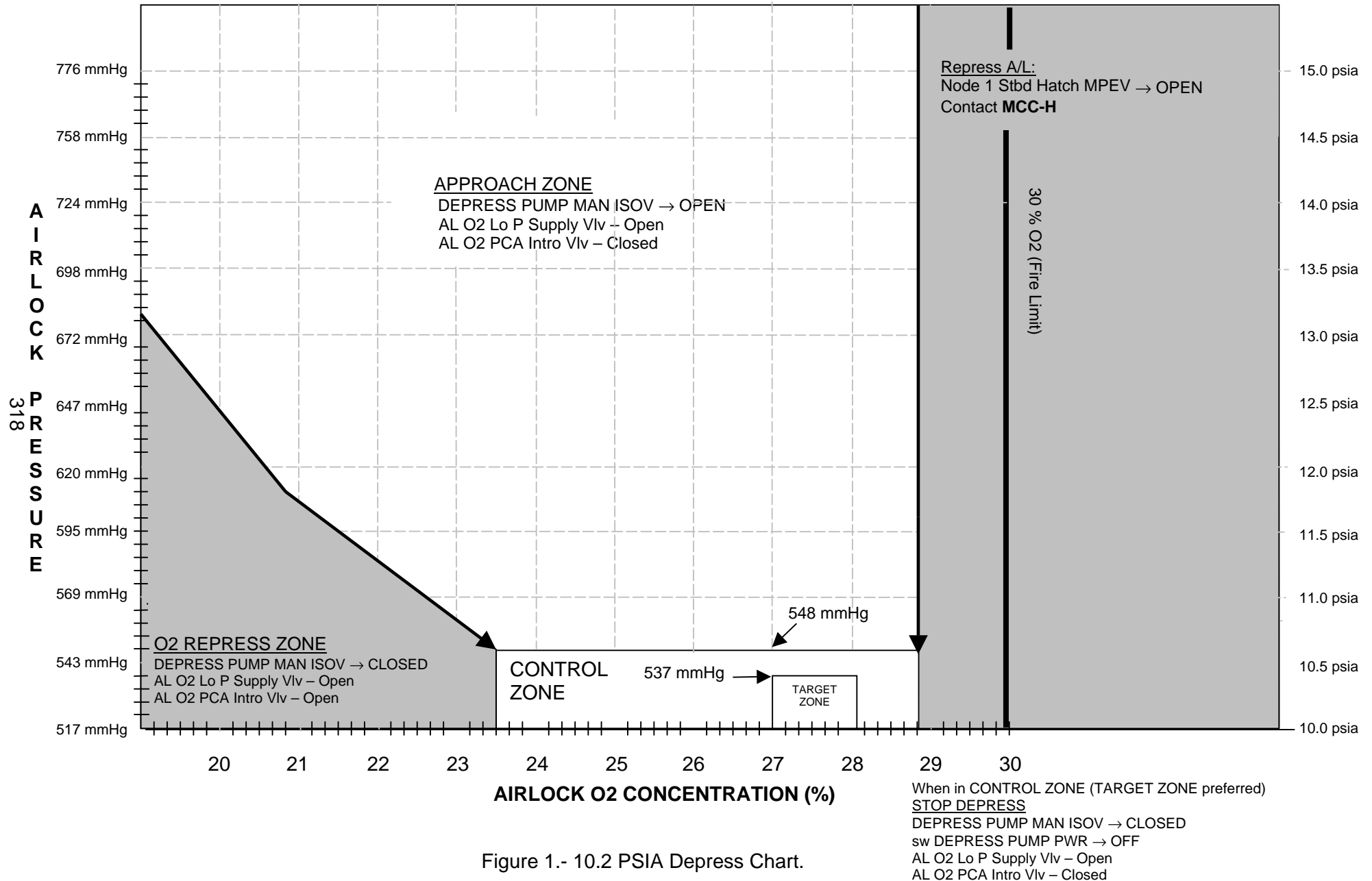


Figure 1.- 10.2 PSIA Depress Chart.

2.220 CONTINGENCY AIRLOCK DEPRESS USING VAJ

(ISS EVA SYS/8A - ALL/FIN 1/Paper on ISS)

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OBJECTIVE:

Depress Joint Airlock in the event of a failed Depress Pump by using the VAJ connected to the Airlock VRIV.

NOTE

This procedure should be performed in conjunction with
1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION.

1. VERIFYING AIRLOCK CONFIGURATION PRIOR TO DEPRESS

PCS

1.1 Node 1: ECLSS: IMV Stbd Aft Fan

Node 1 IMV Stbd Aft Fan

√State – Off

√Speed, rpm: ~7164 ± 50

1.2 Node 1: ECLSS: IMV Stbd Aft Valve

Node 1 IMV Stbd Aft Vlv

√Position – Closed

1.3 Node 1: ECLSS: IMV Stbd Fwd Valve

Node 1 IMV Stbd Fwd Vlv

√Position – Closed

Node 1
Stbd
Hatch

1.4 √Node Stbd Hatch MPEV – CLOSED and uncapped

1.5 √Node 1 Stbd Hatch in the equalize position (orange stripe)

2. VERIFYING AIRLOCK RAPID DEPRESS RESPONSE STATUS

PCS

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'Airlock Depress Response - INT MDM'

√Status – Inhibited

3. OPENING AIRLOCK VRIV

PCS

Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open (√Position – Open)

2.220 CONTINGENCY AIRLOCK DEPRESS USING VAJ

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4. INITIATING AIRLOCK DEPRESS

√**MCC-H** for Target Pressure: _____ mmHg

WARNING

Opening the Emergency MPEV will vent the Airlock to space and may cause a loud hissing noise. Crew in the vicinity should don earplugs.

PCS

Airlock: ECLSS

Airlock: ECLSS

'Equipment Lock'

Monitor Cab Press.

A/L1A2

Emergency MPEV → Open

When Equipment Lock Cab Press = Target Pressure

Emergency MPEV → Closed

5. CLOSING AIRLOCK VRIV

PCS

Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Close'

cmd Close (√Position – Closed)

2.235 METOX REGENERATOR TROUBLESHOOTING

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OBJECTIVE:

Given a fault or error on the Metox Regenerator this procedure provides troubleshooting steps for the crew to perform.

NOTE

1. For error codes that direct crew to contact **MCC-H**, report error code and time indicated on display.
2. If multiple errors present, error codes will be listed sequentially. Contact **MCC-H** prior to taking action.

DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
(none)	Power source interruption of < 5 seconds	Abort Condition (Cooling mode not initiated)	POWER INTERRUPT LED – Blinking	If initiating new regen sw CYCLE → START If terminating previous regen Contact MCC-H to determine additional regen time. sw CYCLE → START
E:02	Attempted to start regeneration in cooling mode	No Start Condition	VALVE/DOOR LED – Blinking	Cycle Oven Door > 90° sw CYCLE → START
E:03	Attempted to start regeneration with sw MODE – STANDBY	No Start Condition	STANDBY LOCAL LED – Blinking	sw MODE → REGENERATE sw CYCLE → START
E:04	Attempted to start regeneration with erroneous REMOTE STANDBY discrete active	No Start Condition	STANDBY REMOTE LED – Blinking	sw MODE → STANDBY sw MODE → REGENERATE sw CYCLE → START Contact MCC-H
E:05	Attempted to start regeneration with sw FAULT OVERRIDE – ON	No Start Condition	FAULT OVERRIDE ON LED – Blinking	sw FAULT OVERRIDE → OFF sw CYCLE → START

2.235 METOX REGENERATOR TROUBLESHOOTING

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:06	Regenerator left in STANDBY > 6 hours when activated during heating cycle	Abort Condition (4-hour cooling mode initiated)	CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	sw POWER → OFF When ready to resume, Perform {1.510 METOX REGENERATION} (SODF: ISS EVA SYS: EMU MAINTENANCE)
E:07	Erroneous boot discrete present without test discrete	Overridable Condition	CTRL LED – On	Contact MCC-H (Controller suspect)
E:08	RAM test failure	Dead Condition	CTRL LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:09	ROM test failure	Dead Condition	CTRL LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:10	Upper Cannister Solenoid overcurrent (> 2.1 to 4.4 amps)	Dead Condition	CTRL LED – On	Contact MCC-H
E:11	Lower Cannister Solenoid overcurrent (> 2.1 to 4.4 amps)	Dead Condition	CTRL LED – On	Contact MCC-H
E:12	Door Unlock Solenoid overcurrent	Dead Condition	CTRL LED – On VALVE/DOOR LED – On	Contact MCC-H
E:13	Door Lock Solenoid overcurrent (> 2.1 to 4.4 amps)	Dead Condition	CTRL LED – On VALVE/DOOR LED – On	Contact MCC-H
E:14	Valve Solenoid overcurrent (> 2.1 to 4.4 amps)	Dead Condition	CTRL LED – On VALVE/DOOR LED – On	Contact MCC-H
E:15	120 V Supply overcurrent (7.0 to 14.6 amps)	Dead Condition	CTRL LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:17	V1 reference is too high (> 6.0 volts)	Dead Condition	CTRL LED – On	Contact MCC-H
E:18	V2 reference is too high (> 6.0 volts)	Overridable Condition	CTRL LED – On	Contact MCC-H
E:19	V1 reference is too low (< 4.0 volts)	Dead Condition	CTRL LED – On	Contact MCC-H
E:20	V2 reference is too low (< 4.0 volts)	Overridable Condition	CTRL LED – On	Contact MCC-H
E:21	Zero 1 reference is too high (> 1.0 volts)	Dead Condition	CTRL LED – On	Contact MCC-H
E:22	Zero 2 reference is too high (> 1.0 volts)	Overridable Condition	CTRL LED – On	Contact MCC-H
E:23	Zero 1 reference is too low (< -1.0 volts)	Dead Condition	CTRL LED – On	Contact MCC-H
E:24	Zero 2 reference is too low (< -1.0 volts)	Overridable Condition	CTRL LED – On	Contact MCC-H
E:25	+12 V too high (> 14.0 volts)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:26	-12 V too high (> -10.0 volts)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:27	+12 V too low (< 10.0 volts)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:28	-12 V too low (< -14.0 volts)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:29	Upper Canister Indicator Solenoid voltage high (Solenoid feedback indicates it is on prior to completion of regeneration)	Dead Condition	CTRL LED – On	Contact MCC-H (Controller suspect)
E:30	Upper Canister Indicator Solenoid voltage low (Solenoid commanded on, but feedback indicates off)	Status Condition	CTRL LED – On	If no other errors present, no action. When regeneration complete, Canister state indicator will require manual actuation to the R position
E:31	Lower Canister Indicator Solenoid voltage high (Solenoid feedback indicates it is on prior to completion of regeneration)	Dead Condition	CTRL LED – On	Contact MCC-H (Controller suspect)
E:32	Lower Canister Indicator Solenoid voltage low (Solenoid commanded on, but feedback indicates off)	Status Condition	CTRL LED – On	If no other errors present, no action. When regeneration complete, Canister state indicator will require manual actuation to the R position
E:33	Watchdog never ready	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H

2.235 METOX REGENERATOR TROUBLESHOOTING

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:34	Watchdog reset too wide	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:35	Fan RPM < 30,000 (15 seconds after start)	Dead Condition	CTRL LED – On FAN LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:36	Fan RPM > 30,000 < 40,000 (for 60 seconds)	Overridable Condition	CTRL LED – On FAN LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:37	Fan RPM > 60,000 (15 seconds after start)	Dead Condition	CTRL LED – On FAN LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:38	Fan > 60000 RPM (for 60 seconds)	Overridable Condition	CTRL LED – On FAN LED – On	Cycle sw POWER If error no longer present, continue with use Contact MCC-H
E:39	Fan did not turn off when commanded <u>NOTE</u> Fan is not nominally commanded off during a regeneration cycle. Abort only occurs if Regenerator was taken to STANDBY.	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On and FAN LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:40	Heater overcurrent (> 6.2 to 12.8 amps)	Abort Condition (4-hour cooling mode initiated)	HEATER LED – On, CYCLE ABORT INITIATED LED – On, and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:41	Heater undervoltage when on (< 94.5)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On and HEATER LED – Blinking with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:42	Heater overvoltage when off (> 25 volts with Server On) (> 10 volts with Server Off)	Dead Condition	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:43	Heater on after power server is off (> 25 volts with Server on) (> 10 volts with Server off)	Abort Condition (4-hour cooling mode initiated)	HEATER LED – Blinking with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H If no comm with MCC-H , sw POWER → OFF
E:44	Heater too slow (failed to bring temp up to set value after Standby mode within 6 hours)	Overridable Condition	HEATER LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:45	Door not indicating latched while regenerating	Overridable Condition	VALVE/DOOR LED – On	√Oven door closed and latched sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:46	Diverter Valve not in Cooling position when commanded	Overridable Condition	VALVE/DOOR LED – On	Contact MCC-H
E:47	Diverter Valve not in Heating position when commanded	Overridable Condition	VALVE/DOOR LED – On	Contact MCC-H
E:48	Diverter Valve position not at Limit default	Overridable Condition	VALVE/DOOR LED – On	Contact MCC-H
E:49	Diverter Valve indicates both Heating and Cooling position	Overridable Condition	VALVE/DOOR LED – On	Contact MCC-H
E:50	Internal Heater Temp Sensor invalid low (T1 < -30° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:51	Internal Heater Temp Sensor invalid low (T2 < -30° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:52	Internal Heater Temp Sensor invalid high (T1 > 600° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:53	Internal Heater Temp Sensor invalid high (T2 > 600° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:54	Internal Heater Temp Sensors invalid (T1 and T2 > 600° F or < -30° F)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On and HEATER LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:55	Internal Heater Temp Sensor overtemp (T1 > 475° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:56	Internal Heater Temp Sensor overtemp (T2 > 475° F)	Overridable Condition	CTRL LED – On HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:57	Internal Heater Temp Sensors overtemp (T1 and T2 > 475° F)	Abort Condition (4-hour cooling mode initiated)	CTRL LED – On and HEATER LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:58	Internal Heater Temp Sensor undertemp (T1 < 225° F after 2 hours heating)	Overridable Condition	HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:59	Internal Heater Temp Sensor undertemp (T2 < 225° F after 2 hours heating)	Overridable Condition	HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:60	Internal Heater Temp Sensors undertemp (T1 and T2 < 225° F after 2 hours heating)	Overridable Condition	HEATER LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:61	Internal Heater Temp Sensor undertemp (T1 < 290° F after 9.5 hours heating)	Overridable Condition	HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:62	Internal Heater Temp Sensor undertemp (T2 < 290° F after 9.5 hours heating)	Overridable Condition	HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:63	Internal Heater Temp Sensors undertemp (T1 and T2 < 290° F after 9.5 hours heating)	Overridable Condition	HEATER LED – On	Contact MCC-H
E:64	Internal Heater Temp Sensor delta out of range (T1 and T2 differ by > 16° to 27° F)	Overridable Condition	HEATER LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:65	Oven Temp Sensor invalid low (T8 < -30° F)	Overridable Condition	CTRL LED – On OVEN HOT LED – On	FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:66	Oven Temp Sensor invalid high (T8 > 440° F)	Overridable Condition	CTRL LED – On OVEN HOT LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:67	Upper and Lower Can Temp Sensors undertemp (T4 and T6 < 250° F after 4 hours heating, indicating low flow)	Overridable Condition	FLOW LED – On UPPER CAN LED - On LOWER CAN LED - On	√CO2 REMOVAL RECEPTACLE CO2 VALVE – REGEN √Airlock CCAA On Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:68	Controller Watchdog failed (lost sync)	Abort Condition	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:69	Controller Watchdog failed (out of sync)	Abort Condition	CTRL LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:70	External Heater Temp Sensor overtemp (T3 > 525° F)	Abort Condition	CTRL LED – On and HEATER LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:71	External Heater Temp Sensor invalid low (T3 < -30° F)	Abort Condition	CTRL LED – On and HEATER LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H
E:72	External Heater Temp Sensor invalid high (T3 > 570° F)	Abort Condition	CTRL LED – On and HEATER LED – On with: CYCLE ABORT INITIATED LED – On and REGENERATE COOLING LED – On, followed by CYCLE ABORT COMPLETE LED – On	Contact MCC-H

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:73	Upper Canister Outlet Temp Sensor invalid low (T4 < -30° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:74	Upper Canister Outlet Temp Sensor invalid low (T5 < -30° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:75	Upper Canister Outlet Temp Sensor invalid high (T4 > 570° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:76	Upper Canister Outlet Temp Sensor invalid high (T5 > 570° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:77	Upper Canister Outlet Temp Sensors invalid (T4 and T5 > 570° F or < -30° F)	Overridable Condition	TEMP LED – On	Contact MCC-H
E:78	Upper Canister Outlet Temp Sensor undertemp (T4 < 250° F between 4 to 10 hours heating)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:79	Upper Canister Outlet Temp Sensor undertemp (T5 < 250° F between 4 to 10 hours heating)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:80	Upper Canister Outlet Temp Sensors undertemp (T4 and T5 < 250° F between 4 to 10 hours heating)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H

2.235 METOX REGENERATOR TROUBLESHOOTING

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:81	Upper Canister Outlet Temp Sensor no heat spike (T4 < 300° F after 10 hours heating)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:82	Upper Canister Outlet Temp Sensor no heat spike (T5 < 300° F after 10 hours heating)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:83	Upper Canister Outlet Temp Sensors no heat spike (T4 and T5)	Status Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:84	Upper Canister too slow (failed to bring temp up to set value after standby mode within 6 hours)	Overridable Condition	UPPER CAN LED – On	Ignore for single Canister regeneration or contact MCC-H
E:85	Lower Canister Outlet Temp Sensor invalid low (T6 < -30° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:86	Lower Canister Outlet Temp Sensor invalid low (T7 < -30° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:87	Lower Canister Outlet Temp Sensor invalid high (T6 > 570° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:88	Lower Canister Outlet Temp Sensor invalid high (T7 > 570° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H

2.235 METOX REGENERATOR TROUBLESHOOTING

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DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:89	Lower Canister Outlet Temp Sensors invalid high (T6 and T7 > 570° F or < -30° F)	Overridable Condition	TEMP LED – On	Contact MCC-H
E:90	Lower Canister Outlet Temp Sensor undertemp (T6 < 250° F between 4 to 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H
E:91	Lower Canister Outlet Temp Sensor undertemp (T7 < 250° F between 4 to 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H
E:92	Lower Canister Outlet Temp Sensors undertemp (T6 and T7 < 250° F between 4 to 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H
E:93	Lower Canister Outlet Temp Sensor no heat spike (T6 < 300° F after 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H
E:94	Lower Canister Outlet Temp Sensor no heat spike (T7 < 300° F after 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H
E:95	Lower Canister Outlet Temp Sensors no heat spike (T6 and T7 < 300° F after 10 hours heating)	Status Condition	LOWER CAN LED – On	Contact MCC-H

2.235 METOX REGENERATOR TROUBLESHOOTING

(ISS EVA SYS/7A - ALL/FIN 3) Page 14 of 14 pages

DISPLAY ERROR CODE	CAUSE DESCRIPTION	IMPACT	FAULT INDICATORS	CREW ACTION
E:96	Lower Canister too slow (failed to bring temp up to set value after Standby mode within 6 hours)	Overridable Condition	LOWER CAN LED – On	Contact MCC-H
E:97	Upper Canister Outlet Temp Sensor delta out of range (T4 and T5 differ by > 17° to 27° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:98	Lower Canister Outlet Temp Sensor delta out of range (T6 and T7 differ by > 17° to 27° F)	Overridable Condition	TEMP LED – On	sw FAULT OVERRIDE → ON √FAULT OVERRIDE ON LED – On Contact MCC-H
E:99	Oven Temp Sensor indicates hot at end of cooling cycle (T8 > 105° F)	Overridable Condition	FLOW LED – On OVEN HOT LED – On	<div style="border: 2px solid black; padding: 5px; text-align: center; background-color: yellow; margin-bottom: 10px;"> CAUTION Canisters may be hot. </div> Open Oven door using MANUAL OVERRIDE. Check for excess heat in oven Contact MCC-H

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 1 of 8 pages

(70 Minutes)

OBJECTIVE:

This procedure allows the campout crewmembers to repress the airlock for required hygiene activities and to allow additional crewmembers in the airlock. The EV crew cannot initiate repress until at least 8:40 have been spent at 10.2 psi and then must spend 70 minutes on PHA Quick Don Masks.

NOTE

MCC-H will nominally perform steps 1 to 4 from the ground prior to repressing the Airlock to 14.7 psia. Steps 1 and 3 do not need to be performed if manual pressure composition control is being used.

MCC-H/IV
PCS

1. INHIBITING AIRLOCK PRESSURE COMPOSITION CONTROL

Airlock: ECLSS: PCA: PCA Commands

AL PCA Commands

'Press Composition Control'

cmd Inhibit

√Airlock ACS State – Monitor

PCS

2. INHIBITING AIRLOCK ALARMS

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Inhibit

Inhibit an Event

input Event Code – 6 3 5 6 (Cabin Pressure Above Normal-E/L)

cmd Arm

cmd Execute

input Event Code – 6 4 6 1 (MCA ppO2 Approaching Limits)

cmd Arm

cmd Execute

input Event Code – 6 5 7 5 (RAPID DEPRESS -LAB)

cmd Arm

cmd Execute

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 2 of 8 pages

NOTE

Per SPN 2562, the PCS rapid sample commands will not work (12A to 15A). The rapid sample commands must be built by the ground.

3. MCA CONFIGURATION

- 3.1 Perform {1.203 BUILD COMMAND FROM TEMPLATE}, all (SODF: GND: C&DH: NOMINAL) to build Rapid Sample Template <LAEA96IM0472K>, then:

input Sequence Item 1 – 6 (Airlock)

cmd <Cmd Inv: LAB_MCA_Rpd_Smpl_Tmplt - (LAEA96IM0472K)>

PCS

- 3.2 US Lab: ECLSS: AR Rack: MCA

LAB MCA

'(ORU 2) Mass Spectrometer Assembly'

√Sample Time – updating every 2 seconds onboard or every 10 seconds on the ground

√Sample Location – Airlock

PCS

4. INHIBITING ISS RAPID DEPRESS RESPONSE AND ALARM

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'INT MDM Rapid Depress Response'

cmd Inhibit Arm (√ – Armed)

cmd Inhibit (√Status – Inhibited)

'CC MDM Rapid Depress Response'

cmd Inhibit Arm (√ – Armed)

cmd Inhibit (√Status – Inhibited)

- 4.1 Inhibiting CCS Low Pressure Safing Response

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'CC MDM Low Cabin P Response'

'Inhibit'

cmd Arm (√Arm Status – Armed)

cmd Inhibit (√Status – Inhibited)

- 4.2 √**MCC** to verify Russian Segment Rapid Depress Response inhibited

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 3 of 8 pages

MASK PREBREATHE INITIATION

EV1,2 A/L1D2 5. Relief Valve of PHA →|← PHA port

WARNING

Positive mask O₂ pressure and fit are necessary to ensure adequate prebreathe.

6. Verify black plates in top of Quick Don Mask are seated in silicon.

7. Don Quick Don Mask.

PHA 8. Quick Don Mask O₂ control → EMERGENCY

9. Momentarily pull mask away from face.

√O₂ flow

10. Record mask P/B initiate time and continue mask prebreathe for 70 minutes.

GMT (MASK P/B INIT: HYGIENE) ____/____:____ ____

WARNING

1. Do not initiate airlock repress until 8:40 at 10.2 psi.
2. Do not terminate prebreathe until airlock pressure is back at 10.2 psia (527 mmHg) and 70 minutes of hygiene prebreathe completed.

REPRESSING AIRLOCK TO 14.7 PSIA

11. Node 1 Stbd Hatch MPEV → Open
Expect airlock repress to take approximately 7 minutes.

12. Open Node 1 Stbd Hatch per decal.

13. ENABLING ISS RAPID DEPRESS RESPONSE AND ALARM

MCC-H,IV

US Lab: ECLSS

Lab: ECLSS

Wait until $|dP/dT| < 0.04$ mmHg/min, then:

13.1 Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'INT MDM Rapid Depress Response'

cmd Enable (√Status – Enabled)

'CC MDM Rapid Depress Response'

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 4 of 8 pages

cmd Enable (√Status – Enabled)

13.2 C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Enable

Enable an Event

input Event Code – 6 5 7 5 (RAPID DEPRESS – LAB)

cmd Execute

13.3 Enabling CCS Low Pressure Safing Response

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'CC MDM Low Cabin P Response'

'Enable'

cmd Enable (√Status – Enabled)

MCC-H,IV

14. INHIBITING A/L RAPID DEPRESS RESPONSE AND ALARM

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'Airlock Rapid Depress Response – INT MDM'

cmd Inhibit – Arm (√Status – Armed)

cmd Inhibit

√Airlock Depress Response–INT MDM Status – Inhibited

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Inhibit

Inhibit an Event

input Event Code – 6 5 7 6 (Rapid Depress-A/L)

cmd Arm

cmd Execute

PCS

15. CONFIGURING THE DEPRESS PUMP

Airlock: ECLSS: Depress Pump: RPCM AL1A4A A RPC 01

RPCM AL1A4A A RPC 01

√Close Cmd – Ena

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 5 of 8 pages

cmd RPC Position – Close (Verify – CI)

WARNING

When dragging PHA hoses through hatches, ensure QDs are within 3 feet of each Hatch.

NOTE

During the period that airlock is at 14.7 psi, IV crew can perform PREP FOR DOWNING steps in {2.320 10.2 PSIA CAMPOUT EVA PREP} (SODF: ISS EVA SYS: OVERNIGHT CAMPOUT) in advance.

EV1,2 16. Perform necessary hygiene activities.

17. Retrieve breakfast.

IV, EV1, EV2 18. Ingress Airlock.

IV 19. CLOSING NODE 1 STBD HATCH

NOTE

Be prepared to initiate depress within 5 minutes of closing the Node 1 Stbd Hatch to prevent high O2 concentrations in the Airlock.

19.1 ✓ **MCC-H** for Go to continue

19.2 ✓ Node 1 Stbd Hatch MPEV – CLOSED and uncapped

19.3 Check hatch seal and close Node 1 Stbd Hatch per decal (omit last step of decal).

20. DEPRESSING TO 10.2 PSIA

20.1 Momentarily pull mask away from face to verify positive O2 flow.

* If no positive O2 flow, contact **MCC-H**.

UIA 20.2 ✓ DEPRESS PUMP ENABLE LED – On

UIA 20.3 sw DEPRESS PUMP PWR → ON

Wait 10 seconds.

C-Lk 20.4 DEPRESS PUMP MAN ISOV → OPEN

✓ Cab Press – Decreasing (use vacuum manometer or PCS)

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 6 of 8 pages

PCS

Airlock: ECLSS

Airlock: ECLSS

'Equipment Lock'

When Cab Press <14.1 psia (729 mmHg)

20.5 Turn Hatch handle in the UNLATCH direction approximately 1.5 turns to place the Hatch in the equalize position (orange stripe).

20.6 Crank Handle – Stowed Position

NOTE

1. CSA-CP % O₂ will read approximately 1 % lower than actual during depress. Stable Airlock pressure is needed to obtain an accurate reading.
2. Per SPN 2563 (12A to 20A), each MCA partial pressure reading of the Airlock will be 86 seconds old before the depress begins, and will increase up to 99 seconds old at 10.2 psia.

20.7 Monitor O₂ using CSA-CP during depress.
Refer to Figure 1.

2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 7 of 8 pages

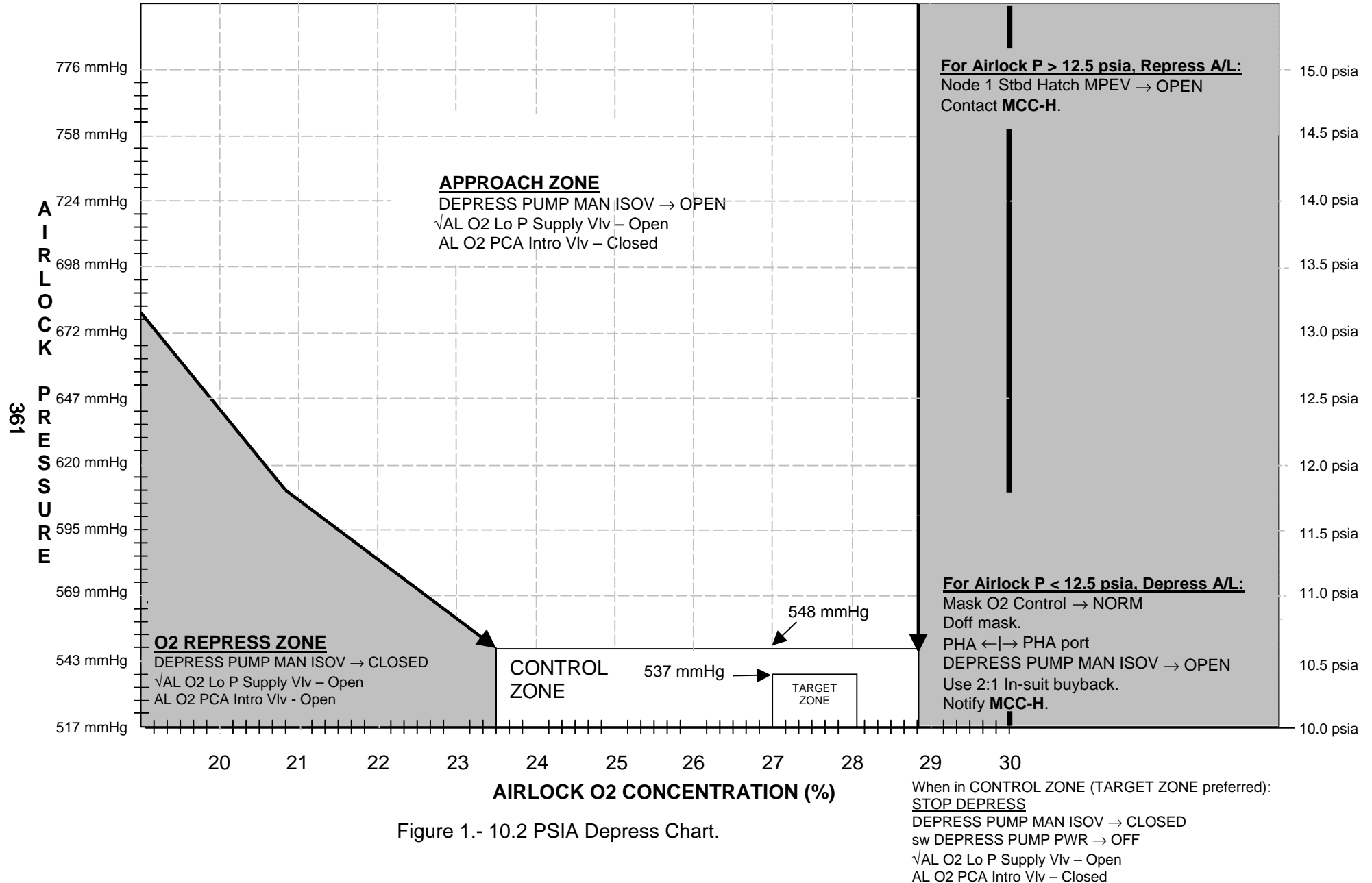


Figure 1.- 10.2 PSIA Depress Chart.

13 JUN 05

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2.315 HYGIENE BREAK

(ISS EVA SYS/7A - ALL/FIN 5/SPN) Page 8 of 8 pages

- When Airlock is at 10.2 psia (527 mmHg)
- C-Lk 20.8 DEPRESS PUMP MAN ISOV → CLOSED
- 20.9 Verify O2 is between 23.5 % and 28.8 %.
- UIA 20.10 sw DEPRESS PUMP PWR → OFF
- MCC-H/IV 21. Perform {1.105 ISS AIRLOCK 10.2 PSIA OPERATIONS INITIATION}, step 8 (SODF: ISS EVA SYS: 10.2 PSIA OPS), then:

WARNING

Do not terminate prebreathe until Airlock pressure at 10.2 psia (527 mmHg) and 70 minutes hygiene prebreathe completed.

When 70 minutes of hygiene prebreathe complete and Airlock at 10.2 psia (527 mmHg)

22. Record Mask P/B terminate time
- GMT (MASK P/B TERM: HYGIENE) ____/____:____ ____
- PHA 23. Quick Don Mask O2 control → NORMAL
24. Doff Quick Don Mask.
- A/L1D2 25. Relief Valve of PHA ←|→ PHA port
- Install cap on PHA port, Relief Valve.
- PHA 26. Stow PHA Quick Don Mask in PHA Bag.

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 1 of 7 pages

(90 Minutes)

OBJECTIVE:

This procedure is performed after 2.315 Hygiene Break to power up and don the EMUs. It assumes that the campout prebreathe protocol is used.

PREP FOR DONNING (30 MINUTES)

1. EVA COMM CONFIG

MCC-H/IV

1.1 Perform {2.701 UHF 1 ORU ACTIVATION}, all (SODF: C&T: NOMINAL: UHF), then:

1.2 Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION FOR UHF OPS}, steps 1 to 11 (SODF: C&T: NOMINAL: AUDIO), then:

STS IV

If orbiter docked

1.3 Perform shuttle EVA COMM CONFIG, all (FDF: EVA: EVA PREP), then:

EV-1,2

2. EMU POWERUP

UIA

2.1 √sw UIA PWR EV-1,2 (two) – OFF
√UIA PWR EV-1,2 LEDs (four) – Off
√EMU O2 SUPPLY PRESS gauge: 850 to 950

C-Lk
wall

2.2 Remove SCU from stowage straps and pouches.
Transfer SCU to E-Lk.

DCM

2.3 Open DCM Cover.
Affix cover with Velcro to DCM.

2.4 SCU →|← DCM

√SCU locked

DCM

2.5 sw POWER → BATT

CAUTION

EMU must be on BATT power when UIA suit power is turned on.

PSA

2.6 √sw SUIT SELECT (two) – OFF
√sw EMU MODE EMU1,2 (two) – PWR

2.7 sw MAIN POWER → ON

√MAIN POWER LED – On

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 2 of 7 pages

2.8 sw SUIT SELECT (two) → EMU 1,2

√EMU 1,2 LEDs (two) – On

√EMU 1,2 Volts: 18.0 to 19.0

UIA 2.9 sw PWR EV-1,2 (two) → ON

√PWR EV-1,2 EMU LEDs (two) – On

DCM 2.10 sw POWER → SCU

2.11 √STATUS: BATT VDC ≥ 20.3

UIA 3. OXYGEN EMU1,2 vlv (two) → OPEN

☐☐☐ 4. Waist ring ←|→ HUT

Temporarily stow LTA.

Remove Multiple Water Connector cover.

☐☐☐ 5. Helmet ←|→ HUT

Temporarily stow helmet.

☐☐☐ 6. Remove Dosimeter from inflight garments.
Insert Dosimeter in LCVG left leg pocket.

☐☐☐ 7. If necessary, apply Medical Kit items. As required, refer to {5.110
[APPROVED NON-EMU HARDWARE](#)}, all (SODF: ISS EVA
SYS: REFERENCE).

☐☐☐ 8. Don MAG, TCU, LCVG, biomed.

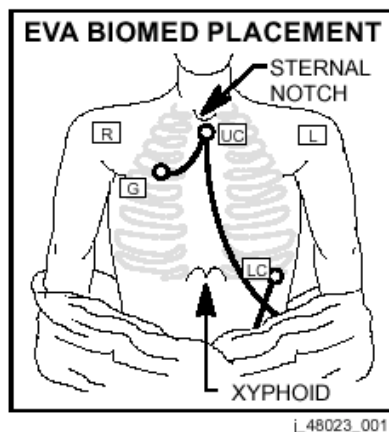


Figure 1.- Nondisposable Biomed Configuration.

☐☐☐ 9. Unstow biomed pigtail from EMU Servicing Kit.

Biomed pigtail →|← signal conditioner

Biomed pigtail →|← electrical harness

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 3 of 7 pages

- ☐☐☐ 10. Don comm cap.

NOTE

Due to an RF interference issue between the hand-held mics and the EMU radios, the hand-held mic should not be used in the vicinity of powered EMU radios.

- DCM ☐☐☐ 11. sw COMM mode → PRI

- ☐☐☐ 12. √sw Comm FREQ – LOW

- ☐☐☐ 13. Verify biomed, EMU data, RF comm with **MCC-H**.

- EV1,2 DCM ☐☐☐ 14. sw COMM mode → HL

- ☐☐☐ 15. Doff comm cap.

- ☐☐☐ 16. Biomed pigtail ←|→ electrical harness

- ATU ☐☐☐ 17. √EACP y-cable →|← ATUs
4,5

- EACP ☐☐☐ 18. √EACP y-cable →|← EACP

sw PWR → ON

√EMU 1,2 mode sel (two) – DUAL

- ATU ☐☐☐ 19. pb PTT → Press
4,5,6 pb 1 → Press (Big Loop)
pb 3 → Press (Shuttle/ISS ICOM)
pb 5 → Press (Airlock)

√Display – ‘**1G, 3, 5T**’ and other loops, as required

√Display – ‘**DUAL**’

EMU DONNING (55 MINUTES)

NOTE

May be performed by EV1 and EV2 simultaneously.

- ☐☐☐ 20. √EDDA latched

- EV1,2 ☐☐☐ 21. Take one aspirin tablet (325 mg), if not taken previously.

- EV1 DCM ☐☐☐ 22. √STATUS: SOP P: 5410 to 6800 (compare with gauge)

- ☐☐☐ 23. √Waist ring – open

- ☐☐☐ 24. Don LTA (attach donning handles as required).

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 4 of 7 pages

If boot bladder manipulation required

25.1 Boot $\leftarrow| \rightarrow$ Leg (sizing ring)

25.2 Pull up excess boot bladder around full circumference of boot disconnect.

WARNING

Keep bladder material clear of threads during reconnection of boot.

25.3 Boot $\rightarrow| \leftarrow$ Leg (sizing ring)

25.4 Lock 1 \rightarrow LOCK

✓All locks (three per boot) are engaged

☐☐☐ 26. ✓Suit arms aligned

☐☐☐ 27. ✓Gloves $\leftarrow| \rightarrow$ EMU
✓Wrist disconnects – open

☐☐☐ 28. Stow IV glasses as required.

☐☐☐ 29. Don thumb loops.

☐☐☐ 30. ✓Drink vlv position

☐☐☐ 31. ✓Biomed connector is outside of HUT

☐☐☐ 32. Don HUT.

☐☐☐ 33. Release thumb loops.

☐☐☐ 34. ✓Suit arms aligned

☐☐☐ 35. Don EV glasses as required.
Don comm cap.

☐☐☐ 36. ✓Comm

☐☐☐ 37. Biomed pigtail $\rightarrow| \leftarrow$ electrical harness

☐☐☐ 38. LCVG $\rightarrow| \leftarrow$ Multiple Water Connector

✓Multiple Water Connector locked

☐☐☐ 39. ✓Thermal cover clear of waist ring

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 5 of 7 pages

☐☐☐ 40. Waist ring → engage position

☐☐☐ 41. Waist ring →|← HUT

√Waist ring locked

☐☐☐ 42. Remove donning handles.
Stow donning handles in EMU Equipment Bag.
Cover waist ring.

CAUTION

Pulling on blue bite valve to adjust position
can cause valve to release from stem.

☐☐☐ 43. √Drink vlv position

☐☐☐ 44. √Mic boom position

☐☐☐ 45. Don comfort gloves, wristlets.

☐☐☐ 46. Wrist rings → engage position

☐☐☐ 47. Don EV gloves.

√EV gloves locked

☐☐☐ 48. Tighten palm restraint straps.

☐☐☐ 49. √sw Glove heater (two) – OFF

☐☐☐ 50. √sw REBA – OFF (toward left arm of suit)

☐☐☐ 51. Lower arm power harness cables →|← Gloves

Stow slack under arm TMG.

☐☐☐ 52. √Cuff C/L position
√Wrist mirrors installed

CAUTION

Flexible Ventilation Duct must be removed from
Crewlock prior to taking EMU fan to ON to avoid
ice formation on UIA water lines.

☐☐☐ 53. Rotate Flexible Ventilation Duct out of C-Lk.

CAUTION

Minimize fan operation with O2 ACT – OFF (~2 minutes).

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 6 of 7 pages

DCM ☐☐☐ 54. sw FAN → ON

☐☐☐ 55. √Electrical harness clear of neck ring

☐☐☐ 56. Don helmet.

√Helmet locked

DCM ☐☐☐ 57. O2 ACT → IV

☐☐☐ 58. √Helmet purge vlv – closed, locked

DCM ☐☐☐ 59. PURGE vlv → closed (down)

If EMU TV capability

☐☐☐ 60. Unstow EMU TV power cable.

☐☐☐ 61. EMU TV power cable ←|→ Ground plug

☐☐☐ 62. EMU TV power cable →|← EMU TV

EV2 ☐☐☐ 63. Repeat steps 19 to 61 if donning performed serially.

EMU CHECK (5 MINUTES)

BOTH ☐☐☐ 64. √Cooling

* If cooling insufficient

* | Slowly cycle Temperature Control Valve between 7 and
* | Max C while IV depresses and holds pump priming
* | valve on back of EMU (30 seconds minimum).

DCM ☐☐☐ 65. Temp control vlv → as required

☐☐☐ 66. √Wrist rings – covered

☐☐☐ √Waist rings – covered

☐☐☐ √sw WATER – OFF

☐☐☐ √sw POWER – SCU

☐☐☐ √sw FAN – ON

☐☐☐ √sw Comm FREQ – LOW

☐☐☐ √Helmet lights – Operational

☐☐☐ √Helmet purge vlv – closed, locked

DCM ☐☐☐ √PURGE vlv – closed (down)

NOTE

During leak check, when **SET O2 IV** message displayed, wait 30 seconds and √SUIT P gauge stable (4.2 to 4.4) before moving O2 ACT → IV.

2.320 10.2 PSIA CAMPOUT EVA PREP

(ISS EVA SYS/7A - ALL/FIN 3/HC) Page 7 of 7 pages

- ☐☐☐ 67. sw DISP → STATUS until LEAK CHECK? displayed
sw DISP → YES

Follow displayed instructions.

```
*****
* If LEAKAGE HI / SUIT P X.X
*   Go to {2.115 FAILED LEAK CHECK (14.7/10.2 PSIA)},
*   all (SODF: ISS EVA SYS: EMU CONTINGENCY).
*****
```

- ☐☐☐ 68. Go to {1.220 EMU PURGE}, all (SODF: ISS EVA SYS: EVA
PREP/POST).

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2.515 EMU PREBREATHE WITHOUT IV

(ISS EVA SYS/E6 - ALL/FIN/HC) Page 1 of 4 pages

OBJECTIVE:

Complete 4-hour in-suit prebreathe, install tools, and make final preparations for Crewlock depressurization.

1. **MCC-H** will monitor prebreathe clock.

Protocol	Prebreathe Duration
In-suit	04:00

EV1,2

2. sw REBA → ON (pull tab toward right arm of suit)

3. DONNING SAFER (15 MINUTES)

When comm permits, **MCC-H** will read the remaining steps of this procedure to the EV crew.

EV1 EV2s
SAFER

- 3.1 PLSS →|← thruster towers

- 3.2 Push latch in and ↻ (~90°)

* If latch will not engage
* | Latch → PRELOAD
* | Latch ↻
* | Latch → ENGAGE
* | Return to step 3.1

- 3.3 Latch → PRELOAD

- 3.4 Latch ↻ until ratcheting

CAUTION
Latch ↻ may disengage SAFER.

- 3.5 Continue ratcheting until lock marking on latch and tower aligned.

- 3.6 Latch → LCK

- 3.7 ✓Access to HCM deploy lever
✓TMG not blocking thruster

EV2

- 3.8 Repeat steps 3.1 to 3.7 for EV1s SAFER.

EV1,2

4. Install miniworkstation, tools, waist tethers, BRTs as required on EMUs.

2.515 EMU PREBREATHE WITHOUT IV

(ISS EVA SYS/E6 - ALL/FIN/HC) Page 2 of 4 pages

EV2 Do not proceed until **MCC-H** reports 1 hour of prebreathe remains.
5. Unstow new Metox canister.

EV1s
PLSS 6. Unzip thermal cover.
Affix thermal cover with Velcro to top of EMU.

WARNING

Fan will be off during changeout. Perform changeout as quickly as possible to avoid CO2 buildup.

CAUTION

Vent loop is pressurized. Restrain Metox canister.

EV1 DCM 7. $\sqrt{O_2}$ ACT – IV
8. Helmet purge vlv → op
9. sw FAN → OFF

EV2 EV1s
PLSS 10. Remove expended Metox canister.
11. Remove caps from new Metox canister.
12. Install Metox using label on canister for proper orientation.
Latch canister in place.

NOTE

EMU may issue **CO2 HIGH** or **MONITOR CO2** message because Metox canister not conditioned yet.

EV1 DCM 13. sw FAN → ON
14. Helmet purge vlv → cl, locked

DCM 15. O2 ACT → PRESS
16. PURGE vlv → op (up)
17. Begin timing 2-minute purge.

EV2 EV1s
PLSS 18. Close thermal cover zipper.
19. Place caps on expended Metox.
Temporarily stow canister.
20. Report Metox canister barcodes and new stowage location to **MCC-H** as comm permits.

2.515 EMU PREBREATHE WITHOUT IV

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- EV1 DCM
- When purge time = 2 minutes
21. ✓STATUS: CO2 < 3.0 mmHg, then:
- PURGE vlv → cl (dn)
22. O2 ACT → IV

NOTE

A minimum of 40 minutes of prebreathe is required to condition Metox canisters.

- EV1,2 23. Repeat steps 5 to 22 for EV2.

- EV1,2 24. pb EMU TV power → Press

✓Green LED – On

- MCC-H PCS** 25. CONFIGURING THE DEPRESS PUMP

Airlock: ECLSS: Depress Pump: RPCM AL1A4A A RPC 01

RPCM AL1A4A A RPC 01

✓Close Cmd – Ena

cmd RPC Position – Close (Verify – CI)

26. OPENING NODE 1 STBD FWD IMV VALVE

Node 1: ECLSS: IMV Stbd Fwd Valve

Node 1 IMV Stbd Fwd Vlv

sel RPCM N14B A RPC 16

cmd RPC Position – Close (Verify – CI)

‘Enable’

cmd Arm (✓Status – Armed)

cmd Enable (✓Status – Enabled)

‘Open’

cmd Arm (✓Status – Armed)

cmd Open (Wait 15 seconds, ✓Position – Open)

- EV1,2
Node 1
Stbd Hatch
27. ✓Ribbed side (EVA side) Hatch Handle in properly stowed position
(Handle should be engaged on Handle Stowage Retaining Key,
pointing up towards UNLATCH direction.)

28. ✓Latch Ratchet – LATCH

2.515 EMU PREBREATHE WITHOUT IV

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29. ✓Node 1 Stbd Hatch MPEV – CLOSED (✓cap remains removed)

30. Close Node 1 Stbd Hatch per decal.

Eq-Lk 31. ✓IV Hatch equalization valve – OFF (✓cap remains removed)

32. EMERGENCY MPEV → OPEN

33. Ingress C-Lk.

C-Lk 34. ✓DEPRESS PUMP MAN ISOV – CLOSED

CAUTION

Hatch mechanism is a pinch point. Keep all suit components clear of mechanism.

35. IV Hatch → CLOSE, lock

When in-suit prebreathe time complete

UIA

36. ✓sw DEPRESS PUMP PWR – OFF

✓DEPRESS PUMP ENABLE LED – On

On MCC-H GO, go {CREWLOCK DEPRESS/REPRESS
WITHOUT IV CUE CARD} CREWLOCK DEPRESS (SODF:
ISS EVA SYS: NO IV EVA).

HOOK
VELCROHOOK
VELCRO**CREWLOCK DEPRESS/REPRESS WITHOUT IV CUE CARD**

(ISS EVA SYS/E6 - ALL/FIN/Paper on ISS) Page 1 of 2 pages

CREWLOCK DEPRESS (30 MINUTES)

- When prebreathe complete
- | | |
|--------------|---|
| DCM | 1. √sw Comm FREQ – LOW |
| | 2. √sw COMM mode → PRI |
| UIA | 3. sw DEPRESS PUMP PWR → ON
(wait 10 seconds for complete startup) |
| C-Lk | 4. DEPRESS PUMP MAN ISOV → OPEN, (expect alert tone)
Monitor Suit P gauge < 5.5. |
| | ***** |
| | * If gauge > 5.5 |
| | * Stop depress, √ MCC-H |
| | ***** |
| DCM | 5. C-Lk at 6.0, (expect alert tone) |
| | When C-Lk at 5.0 psia (259 mmHg) |
| C-Lk | 6. DEPRESS PUMP MAN ISOV → CLOSED, (expect alert tone) |
| DCM | 7. sw DISP → STATUS until <u>LEAK CHECK?</u> displayed
sw DISP → YES, follow displayed instructions |
| | ***** |
| | * If <u>LEAKAGE HI SUIT P X.X</u> |
| | * Perform {2.110 FAILED LEAK CHECK (5 PSIA)} |
| | * (SODF: ISS EVA SYS: EMU CONTINGENCY), then: |
| | ***** |
| | 8. √O2 ACT – EVA |
| | 9. √STATUS, compare with Cuff Checklist page 1 |
| | 10. DEPRESS PUMP MAN ISOV → OPEN, (expect alert tone)
Monitor SUIT P gauge < 5.5. |
| MCC-H | 11. Airlock: ECLSS: PCA: VRIV
'Open'
cmd Arm (√Status – Armed)
cmd Open (√Position – Open) |
| | ***** |
| | * If gauge > 5.5 |
| | * DEPRESS PUMP MAN ISOV → CLOSED |
| | * ↓ MCC-H : 'Stop depress' |
| | * MCC-H perform step 16. |
| | ***** |
| | When C-Lk at 2.0 psia (103 mmHg) |
| C-Lk | 12. DEPRESS PUMP MAN ISOV → CLOSED |
| UIA | 13. sw DEPRESS PUMP PWR → OFF |
| C-Lk | 14. Attach waist tethers to C-Lk D-ring for egress. |
| DCM | When C-Lk dP/dT ~ 0, expect alert tone |
| | When EV Hatch ΔP < 0.5 psi (26 mmHg) |
| C-Lk | 15. EV Hatch → open, stow |
| MCC-H | 16. Airlock: ECLSS: PCA: VRIV
'Close'
cmd Close (√Position – Closed) |

POST DEPRESS (5 MINUTES)

- | | |
|------|---|
| DCM | 1. sw POWER → BATT (stagger switch throws), expect warning tone
(MCC-H record GMT ____/____:____) <u>EVA PET = 00:00</u> |
| UIA | 2. sw PWR EV-1,2 (two) → OFF
√PWR EV-1,2 LEDs (four) – Off |
| DCM | 3. SCU ← → DCM |
| | 4. Install DCM cover. |
| | 5. Stow SCU in pouch. |
| C-Lk | 6. √DEPRESS PUMP MAN ISOV – CLOSED |
| DCM | 7. Temp control vlv → Max H |
| | 8. sw WATER → ON |
| | 9. √DCM blank, BITE – off |
| | 10. Temp control vlv → 3 to Max C |
| | 11. √STATUS, compare to Cuff Checklist page 1 (MCC-H record) |
| | 12. Visors as required. |
| | 13. Go to { CREWLOCK EGRESS } (SODF: ISS EVA SYS: CUFF
CHECKLIST) page 34 or EVA specific timeline. |

EVA-1a/E6 - ALL/C

HOOK
VELCRO

HOOK
VELCRO

CREWLOCK DEPRESS/REPRESS WITHOUT IV
(ISS EVA SYS/E6 - ALL/FIN/Paper on ISS) Page 2 of 2 pages

PRE REPRESS (5 MINUTES)

- 1. √SCU →|← DCM
- DCM 2. √sw WATER – OFF (for at least 2 minutes before proceeding)
- 3. √EV Hatch closed, locked
- 4. Waist tethers ←|→ C-Lk D-ring, attach to EMUs
- UIA 5. √OXYGEN EMU1,2 vlv (two) – OPEN
- 6. sw PWR EV-1,2 (two) → ON
- √PWR EV-1,2 EMU LEDs (two) – On
- √PWR EV-1,2 VOLTS = 18.0 to 19.0
- DCM 7. sw POWER → SCU, (expect warning tone)

CREWLOCK REPRESS (10 MINUTES)

WARNING

If on SOP, leave O2 ACT – EVA thru C-Lk repress.

- DCM 1. O2 ACT → PRESS
- 2. sw COMM mode → HL
- C-Lk 3. √EV Hatch MPEV – CLOSED
- 4. IV Hatch equalization valve → throttle OFF to NORM (as required),
(expect alert tone)
(MCC-H record GMT_____/:_____)
- DCM 5. C-Lk at 4.0, (expect alert tone)
- When C-Lk at 5.0 (259 mmHg)
- C-Lk 6. IV Hatch equalization valve → OFF, (expect alert tone)
Wait 2 minutes for C-Lk pressure to stabilize, then:
- MCC-H** 7. Airlock: ECLSS
Record Crew Lock Press: _____mmHg (P1)
Wait 1 minute, then record again: _____mmHg (P2)

* If $\Delta P \geq 9$ mmHg (where $\Delta P = P1-P2$)
* | Go to {2.530 CREWLOCK LARGE LEAK
* | RESPONSE WITHOUT IV} (SODF: ISS EVA
* | SYS: NO IV EVA).
*
* If $\Delta P > 2$ mmHg (where $\Delta P = P1-P2$)
* | Go to {2.525 CREWLOCK SMALL LEAK
* | RESPONSE WITHOUT IV} (SODF: ISS EVA
* | SYS: NO IV EVA).

- 8. √Gloves heaters – OFF, gloves clean
- WARNING**

1. If CUFF 1 symptoms resolving upon repress, report as CUFF 2.

2. If any DCS, leave O2 ACT – PRESS.
- DCM 9. O2 ACT → IV
- C-Lk 10. IV Hatch equalization vlv → throttle OFF to NORM, (expect alert tone)
- DCM When C-Lk dP/dT ~ 0, (expect alert tone)
- 11. Go to {2.520 POST EVA WITHOUT IV} (SODF: ISS EVA SYS: NO IV EVA).

2.525 CREWLOCK SMALL LEAK RESPONSE WITHOUT IV

(ISS EVA SYS/INC 9 - ALL/FIN/HC/Paper on ISS) Page 1 of 5 pages

(90 Minutes with Hatch inspection)
(65 Minutes without Hatch inspection)

OBJECTIVE:

This procedure provides the crew with the necessary steps to safe the Airlock in the event that the Crewlock fails its 5 psi leak check upon Repress. A small leak is defined as one which can be supported by consumables to allow for EV crew to ingress the Equipment Lock and perform safing activities at a habitable pressure. This procedure assumes two EVA crewmembers and no IV crew.

CONFIGURING EMU

EV DCM 1. √sw Comm FREQ – LOW

sw COMM mode → PRI

NOTE

Steps 3 to 13 depress the Crewlock to vacuum and have the EV crew reopen the EV Hatch to check if there is debris that was caught in the hatch when it was closed. Steps 3 to 13 can be performed only if Time and Consumables permit.

MCC-H 2. Inform EV crew whether or not consumables permit performing steps 3 to 13.

DEPRESS CREWLOCK AND INSPECT EV HATCH SEALS (25 MINUTES)

EV DCM 3. √SCU →|← DCM

4. √STATUS: SUIT P 4.2 to 4.4, compare with gauge

5. O2 ACT → EVA (expect SET O2 PRESS msg, sw DISP → PRO)

MCC-H 6. Airlock: ECLSS: PCA: VRCV
PCS AL PCA VRCV

√Status – Operational

√Position – Closed

Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open (√Position – Open)

EV DCM 7. Monitor Suit P gauge < 5.5.

* If Suit P gauge ≥ 5.5 psid

* | Stop depress.

* | Contact **MCC-H**.

2.525 CREWLOCK SMALL LEAK RESPONSE WITHOUT IV

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8. ACTIVATING DEPRESS PUMP

MCC-H
PCS

8.1 Airlock: ECLSS: Depress Pump: RPCM AL1A4A A RPC 01
RPCM AL1A4A A RPC 01

√Close Cmd – Ena

cmd RPC Position – Close (√Position – Cl)

EV UIA

8.2 √DEPRESS PUMP ENABLE LED – On

sw DEPRESS PUMP PWR → ON
(wait 10 seconds for startup)

C-lk

8.3 DEPRESS PUMP MAN ISOV → OPEN

When C-Lk at 2.0 psia (103 mmHg)

9. DEPRESS PUMP MAN ISOV → CLOSED

UIA

10. sw DEPRESS PUMP PWR → OFF

DCM

11. When C-Lk dP/dT ~0, EV expect alert tone

When EV Hatch $\Delta P < 0.5$ psi (26 mm Hg)

EV C-Lk

12. EV Hatch → open

Inspect EV Hatch seals and remove any debris that is present.

MCC-H
PCS

13. Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Close'

cmd Close (√Position – Closed)

REPRESSING CREWLOCK (10 MINUTES)

EV C-Lk

14. √Thermal cover – closed

√EV Hatch MPEV – CLOSED

EV Hatch → close, lock

DCM

15. O2 ACT → PRESS

C-Lk

16. IV Hatch equalization valve → throttle OFF to NORM (as required, expect alert tone)

DCM

17. C-Lk at 4.0, expect alert tone.

When C-Lk at 5.0 (259 mm Hg)

C-Lk

18. IV Hatch equalization valve → OFF (expect alert tone)

2.525 CREWLOCK SMALL LEAK RESPONSE WITHOUT IV

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Wait 30 seconds for pressure stabilization, then proceed
19. \checkmark C-Lk pressure integrity (2 minutes, $\Delta P \leq 0.1$ psi)

If leak check passed

20. Go to CREWLOCK REPRESS {CREWLOCK
DEPRESS/REPRESS WITHOUT IV CUE CARD}
steps 8 to 11 (SODF: ISS EVA SYS: NO IV EVA).

- C-Lk 21. IV Hatch equalization vlv \rightarrow throttle OFF to NORM (EMER) (as required, EV expect alert tone)

WARNING

1. If Cuff 1 symptoms resolving upon repress, report as Cuff 2.
2. If any DCS, leave O2 ACT – PRESS.

DCM When C-Lk P > 5.0 psia

22. O2 ACT \rightarrow IV
23. When C-Lk dP/dT ~ 0 , (EV expect alert tone)

CAUTION

Verify EV crew is clear of hatch mechanism.

DOFFING EMU AND POWERDOWN (25 MINUTES)

- EV 24. To doff EMUs, perform {2.520 POST EVA WITHOUT IV} steps 1 to 25 and 28 (SODF: ISS EVA SYS: NO IV EVA), then:

- UIA 25. sw PWR EV-1,2 (two) \rightarrow OFF

\checkmark PWR EV-1,2 LEDs (four) – Off

- PSA 26. sw SUIT SELECT (two) \rightarrow OFF

\checkmark SUIT SELECT LEDs (four) – Off

27. sw MAIN POWER \rightarrow OFF

\checkmark MAIN POWER LED – Off

- EACP 28. sw PWR \rightarrow OFF

- DCM 29. SCU \leftarrow | \rightarrow DCM

Install DCM Cover.

30. Insert SCU in stowage pouch.

2.525 CREWLOCK SMALL LEAK RESPONSE WITHOUT IV
(ISS EVA SYS/INC 9 - ALL/FIN/HC/Paper on ISS) Page 4 of 5 pages

REMOVING SCU AND TOOLS FROM CREWLOCK (30 MINUTES)

- | | |
|-----------------|---|
| C-Lk | 31. Unstow from C-Lk IV Bag:
7/16" Socket with 6" extension (in socket caddy)
EVA Ratchet |
| UIA | 32. ✓WATER SUPPLY EV-1, 2 vlv (two) – CLOSE
✓WATER REGULATOR EV-1,2 vlv (two) – CLOSE
✓OSCA – O2 CLOSED (O2 3AKP) |
| MCC-H/EV
PCS | 33. <u>CLOSING AIRLOCK O2 HI PRESSURE SUPPLY VALVE</u>
Airlock: ECLSS: O2 Hi Pressure Supply Valve
AL O2 Hi Pressure Supply Valve |

cmd Close (Verify Actual Position – Closed)

NOTE

Removal of ОРЛАН caps is technique sensitive. For removal instructions, push cap inward and rotate clockwise (opposite the displayed arrow), 1/8 turn; then pull outward. Refer to Figure 1.



Figure 1.- OSCA and ОРЛАН Caps.

- | | | |
|----|-----|---|
| EV | UIA | 34. ОРЛАН-I (II) cap 2 ← → OSCA
ОРЛАН-I (II) cap 3 ← → OSCA

OSCA ↻ PRESS (НАДДУВ) |
|----|-----|---|

2.525 CREWLOCK SMALL LEAK RESPONSE WITHOUT IV
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35. √OXYGEN EMU 1, 2 vlv (two) – OPEN

NOTE

The next step will depressurize the SCU and UIA supply lines via the OSCA prior to removal of the SCU.

36. OXYGEN ORLAN vlv → OPEN

When purge no longer audible

37. √EMU O2 SUPPLY PRESS gauge \cong 0
√ORLAN O2 SUPPLY PRESS gauge \cong 0

38. OSCA ↻ O2 CLOSED (O2 3AKP)

ОРЛАН-I (II) cap 2 → | ← OSCA
ОРЛАН-I (II) cap 3 → | ← OSCA

39. OXYGEN EMU 1,2 vlv (two) → CLOSE

55. OXYGEN ORLAN vlv → CLOSE

C-Lk

40. Remove SCU from stowage straps on C-Lk wall.

UIA

41 SCU ← | → UIA (by turning SCU Mating bolts (two) ↻ using ratchet with 7/16" Socket (\cong 15 turns each)).

42 Strain relief hooks (two) ← | → tether points (two) on C-Lk wall

43. √DEPRESS PUMP MAN ISOV – CLOSED

44. Remove stowage pouches from C-Lk restraint straps (leave DCM connectors inside pouches).

45. Transfer to E-Lk from C-Lk
SCUs (with pouches)
Crewlock EVA Bags (four)
IV Bag
Staging Bag
All additional EVA tools

E-Lk

46. Close IV Hatch per decal.

√IV Hatch equalization valve – OFF

47. Install IV Hatch equalization valve cap.

48. Perform {2.520 POST EVA WITHOUT IV} (SODF: ISS EVA SYS: NO IV EVA), then:

√MCC-H for deltas

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2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

(ISS EVA SYS/INC 9 - ALL/FIN/Paper on ISS)

Page 1 of 6 pages

(105 Minutes without second repress attempt)

OBJECTIVE:

Given a large Crewlock leak that cannot be supported during Crewlock repress, this procedure depresses the Equipment Lock to vacuum for EV crew ingress and repress.

NOTE

1. No IV crew is available for this procedure.
2. The VRIV and VRCV are assumed to be fully operational.

DEPRESSING CREWLOCK (25 MINUTES)

EV DCM

1. √sw Comm FREQ – LOW

2. sw COMM mode → PRI

C-Lk

3. √IV Hatch equalization valve – OFF

DCM

4. O2 ACT → EVA

MCC-H

PCS

5. Airlock: ECLSS: PCA: VRCV

AL PCA VRCV

√Status – Operational

√Position – Closed

Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Open'

cmd Arm (√Status – Armed)

cmd Open (√Position – Open)

EV DCM

6. Monitor SUIT P gauge < 5.5.

* If gauge > 5.5, stop depress, √**MCC-H**.

EV C-Lk

If EV Hatch MPEV is usable per **MCC-H**

7. EV Hatch MPEV → OPEN

8. Attach waist tethers to C-Lk (UIA) D-ring.

9. When C-Lk dP/dT ~ 0, (EV expect alert tone)

2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

(ISS EVA SYS/INC 9 - ALL/FIN/Paper on ISS)

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When EV Hatch $\Delta P < 26$ mmHg (0.5 psi)

10. EV Hatch → open, stow

11. EV Hatch MPEV → CLOSED

12. Inspect EV Hatch seals for damage and debris.

13. Remove debris as required.

MCC-H

14. ✓ EMU consumables

If second repress attempt desired and > 90 minutes of EMU consumables remain

EV

15. ✓ Thermal cover – closed

16. EV Hatch → close and lock

17. Go to CREWLOCK REPRESS {CREWLOCK DEPRESS/REPRESS WITHOUT IV CUE CARD} steps 3 to 11 (SODF: ISS EVA SYS: NO IV EVA).

If < 80 minutes of EMU Metox (LiOH) remain

18. Helmet Purge vlv → open

PREPARING EQUIPMENT LOCK FOR VACUUM (20 MINUTES)

MCC-H	EV
19. Perform {2.535 EQUIPMENT LOCK CONFIG FOR VACUUM WITHOUT IV} steps 1 to 6 (SODF: ISS EVA SYS: NO IV EVA), then:	C-Lk 20. Begin removing every other Velcro strap from SCU. C-Lk IVA Bag: 21. Retrieve EVA Ratchet and 7/16" X 6" wobble socket. DCM 22. Cold soak as time allows. Temp control vlv → increase toward Max C (slightly colder than comfortable)

EQUIPMENT LOCK DEPRESS (15 MINUTES)

MCC-H

23. Give a go for Equipment Lock depress.

EV C-Lk

24. ✓ EV Hatch – open and stowed

25. IV Hatch equalization valve → EMER

2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

(ISS EVA SYS/INC 9 - ALL/FIN/Paper on ISS)

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MCC-H
PCS

26. Airlock: ECLSS: PCA: VRCV
AL PCA VRCV
'Open'

cmd Arm (√Status – Armed)
cmd Open (√Position – Open)

WARNING

Hatch latch mechanism is a pinch hazard.
Verify EV crew is clear of it.

MCC-H

When E-Lk pressure ~ 0.0 psia (expect ~ 10 to 15 minutes)

27. Give EV crew a go to open IV Hatch

EV C-Lk

28. Open IV Hatch per decal.
29. IV Hatch equalization valve → OFF
30. EV Hatch Thermal Cover → Close
31. Partially close EV Hatch. Leave small gap for water sublimation.
32. Waist Tethers ←|→ C-Lk D-ring; attach to EMUs

CONFIGURING FOR SCU REMOVAL (5 MINUTES)

33. Transfer the following to Equipment Lock and secure:
- IV Bag
 - Staging Bag
 - Crewlock EVA Bags (four)
 - All ORUs

If Helmet Purge vlv open (per step 18, to conserve Metox/LiOH)

34. Helmet Purge vlv → close and lock

- DCM 35. √STATUS: O2 P > 850

WARNING

EV crew will be without SCU O2 supply for approximately 45 minutes. If Metox (LiOH) canister expended, open/close helmet purge valve as required to maintain safe ppCO2 levels. The SOP may be required to complete the procedure.

2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

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MCC-H

PCS

36. CLOSING AIRLOCK O2 HI PRESSURE SUPPLY VALVE

Airlock: ECLSS: O2 Hi Pressure Supply Valve

AL O2 Hi Pressure Supply Valve

cmd Close (Verify Actual Position – Closed)

EV

DCM

37. sw POWER → BATT, (expect warning tone)

UIA

38. sw PWR EV-1,2 (two) → OFF

√PWR EV-1,2 LEDs (four) – Off

DCM

39. SCU ←|→ DCM

Install DCM cover.

C-lk

40. Stow SCU in pouch.

DCM

41. Temp control vlv → Max H

42. sw WATER → ON

43. √DCM blank, BITE – off

44. Temp control vlv → between 3 and Max C (slightly colder than comfortable)

MCC-H

PCS

45. DISABLING THE POWER SUPPLY ASSEMBLY

Airlock: EPS: RPCM AL2A3B B

sel RPC 18

RPCM AL2A3B B RPC 18

cmd Open Cmd – Enable (√Open Cmd – Ena)

cmd RPC Position – Op (√RPC Position – Op)

MCC-H

46. Give EV crew a go for SCU removal.

REMOVING SCU FROM UIA (20 MINUTES)

MCC-H	EV
47. Perform {2.535 EQUIPMENT LOCK CONFIG FOR VACUUM WITHOUT IV} steps 7 and 8 (SODF: ISS EVA SYS: AIRLOCK CONTINGENCY), then:	<div>CAUTION ОПЛАН caps on UIA are not tethered. Be prepared to catch them during removal.</div> <p>48. Perform {SCU REMOVAL FROM UIA (AT VACUUM)} pages 32 and 33 (SODF: ISS EVA SYS: CUFF CHECKLIST), then:</p>

2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

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EQUIPMENT LOCK INGRESS (5 MINUTES)

EV DCM

49. Begin maximum cold soak.

Temp control vlv → Max C

50. Transfer SCUs to E-Lk and secure.

51. ✓ All items removed from C-Lk.

NOTE

EV crew will be without cooling after the next step.

DCM

52. sw WATER → OFF

53. EV Hatch → fully close, lock

54. Ingress E-Lk.

55. Close IV Hatch per decal, lock.

✓ IV Hatch equalization valve – OFF

A/L1A2

56. EMERGENCY MPEV → CLOSED

EQUIPMENT LOCK REPRESS (15 MINUTES)

WARNING

The VRIV and VRCV must be closed in order to repress the Equipment Lock.

NOTE

EV crew disregard SET O2 PRESS message during repress.

MCC-H

57. Give a go for Equipment Lock Repress

EV

58. Node 1 Stbd Hatch MPEV → throttle CLOSED to OPEN (as required), EV expect alert tone

2.530 CREWLOCK LARGE LEAK RESPONSE WITHOUT IV

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If EV crew consumables/condition permit

MCC-H

59. When E-Lk at 1.0 psi, perform IV Hatch leak check
 - 59.1 Node 1 Stbd Hatch MPEV → CLOSED (EV expect alert tone)
 - 59.2 Wait 30 seconds for pressure stabilization.
 - 59.3 √E-Lk pressure integrity (2 minutes, $\Delta P < 1.5$ mmHg)
 - 59.4 Node 1 Stbd Hatch MPEV → throttle CLOSED to OPEN (as required), EV expect alert tone

EV

60. E-Lk at 4.0 psi, EV expect alert tone

WARNING

1. If Cuff 1 symptoms resolving upon repress, report as Cuff 2.
2. If any DCS, O2 ACT → PRESS instead of IV in the next step.

DCM

When E-Lk at 5.0 psi

61. O2 ACT → IV

WARNING

Verify EV crew is clear of hatch latch mechanism.

When E-Lk dP/dT ~0 (EV expect alert tone)

62. Open Node 1 Stbd Hatch per decal.

63. √Node 1 Stbd Hatch MPEV – CLOSED

EV

64. Install IV Hatch equalization valve cap.

MCC-H	EV
65. Go to {4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE} (SODF: ISS EVA SYS: AIRLOCK CONTINGENCY).	66. Perform {2.520 POST EVA WITHOUT IV} (SODF: ISS EVA SYS: NO IV EVA), then: √ MCC-H for deltas

NORMAL EVA STATUS

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NORMAL EVA STATUS

O2 POS	EVA
TIME EV	HH:MM since PWR-BATT
TIME LF/ Limit consum	HH:MM remaining at present use rate
% O2 (PWR) LF	Nonlimiting consumable will be displayed
SUIT P	4.2 to 4.4 psid
O2 P	150 to 950 psia
SOP P	5410 to 6800 psia
SUBLM P	2.0 to 4.2 psia
BAT VDC	≥ 16.7
BAT AMP	3.0 to 4.0
RPM	18.0 to 20.0 K
CO2	0.2 to 2.0 mm
H2O TEMP	32 to 75° F
H2O GP/WP	14.0 to 16.0 psid
GAUGE	4.2 to 4.4 psid

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DCM
CONFIG
MAL
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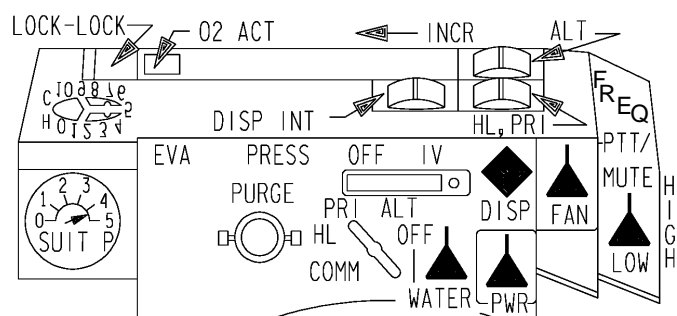
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DCM CONFIG

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

NORM
EVA
STAT



EVA COMM FREQUENCIES

LOW=414.2 MHz

HIGH=417.1 MHz

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EMU MALFUNCTION INDEX

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

+				+			
EMU MALFUNCTION INDEX							
ABORT EVA	6	O2 USE HIGH	14				
AIR FLOW CONT	21	PWR LF (%)	24				
BATT AMPS HI	9	RESRV H2O ON	17				
BATT VDC LOW	10	RLF V FAIL	23				
BITE light	23	SET H2O OFF	24				
COMM FAIL	20	SET O2 EVA	24				
CO2 HIGH	19	SET O2 PRESS	24				
DCS	4	SET PWR SCU	24				
FAN SW OFF	24	SOP O2 ON	8	DCS			
H2O GP LOW	16	SOP P LOW	13				
H2O IS OFF	24	SUBLM P	15				
LIMITS BAD	23	SUIT P EMERG	23				
LOSS OF COOLING	22	SUIT P HIGH	12				
MONITOR CO2	19	SUIT P LOW	11				
NO VENT FLOW	18	TERMINATE EVA	7				
O2 IS OFF	24	TIME LF: XX	24				
O2 LF (%)	24	VENT SW FAIL	23				

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DECOMPRESSION SICKNESS (DCS)

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DECOMPRESSION SICKNESS (DCS)

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Class 1

Symptoms: Mild pain (single/multiple sites) and/or single extremity numbness/tingling. Difficult to discern from suit pressure points. Symptoms do not interfere with performance.

DCM
CONFIG
MAL
INDEX

DCS Action: Report in POST EVA PMC.

Class 2

Symptoms: Moderate Class 1 symptoms that interfere with performance or symptoms that resolve upon repress.

Action: Perform worksite cleanup, minimize activity of affected crewmember, TERM EVA; REPRESS

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DECOMPRESSION SICKNESS (DCS)

(ISS EVA SYS/7A - ALL/FIN 1)

Page 2 of 2 pages

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DECOMPRESSION SICKNESS (DCS) (CONT)

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Class 3

Symptoms: Severe Class 1 symptom or migratory, trunkal/multiple site numbness/tingling, unusual headache.

Action: Assist affected crewmember to C-Lk, safe worksite, TERM EVA; REPRESS.

Class 4

Symptoms: Serious symptom – central neurological, cardiopulmonary

Action: ABORT EVA.
Assisted return of affected crewmember to C-Lk, repress affected crewmember solo. Unaffected crewmember safe worksite, TERM EVA; REPRESS.

ABORT
EVA

TERM
EVA

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ABORT EVA

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

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ABORT EVA

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BOTH: Ingress C-Lk.
Unhook from reel.
Outer (EV) Hatch – close and lock
Go to EMERGENCY CREWLOCK REPRESS
decal (airlock hatches).

DCS

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TERMINATE EVA

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TERMINATE EVA

1. Ingress C-Lk.
2. Connect SCU.

WARNING

If terminating due to BATT AMPS HIGH (system short), do not perform step 3.

- UIA
3. sw PWR EV-1(2) → ON
 4. √OXYGEN EMU1(2) vlv – OPEN

NOTE

If fan stops during power transfer
Cycle FAN switch – OFF,ON

- DCM
5. PWR → SCU (fwd)
 6. WATER → OFF (fwd)
 7. √SUIT P ≥ 3.3 and stable
 8. Monitor EMU status.
 9. Coordinate Ingress with EV1(2).

SOP
ON
BATT
AMPS

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SOP O2 ON

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SOP O2 ON

SOP O2 ON	TIME LF HH'MM
-----------	---------------

1. Go to ABORT EVA, 6. >>

<p><u>NOTE</u> Message triggered when: SUIT P < 4.05 <u>and</u> SOP RATE > 36.0 psi/min.</p>
--

ABORT
EVA

TERM
EVA



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BATT AMPS HIGH

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BATT AMPS HIGH

BATT AMPS HI	BAT AMPS X.X	BAT VDC XX.X
--------------	--------------	--------------

1. Helmet purge vlv → op

2. sw FAN → OFF

If BAT AMP without fan > 1.3 (system short)

3. sw WATER → OFF

4. Notify IV/EV of impending communication loss.

5. sw POWER → SCU, do not take UIA EV-1(2) PWR → ON

6. Go to TERM EVA, 7.

If BAT AMP without fan 0.7 to 1.3 (fan short)

7. Go to TERM EVA, 7.

NOTE

Message triggered when amps > 5.0.

Normal BATT AMP: 3.0 to 4.0.

Normal BATT AMP without fan: 0.7 to 1.3.

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BATT
VDC
SUIT
P LOW

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SOP
ON

BATT
AMPS

1. Go to TERM EVA, 7.

2. Continue EVA.

Message triggered when VOLTS < 15.7.
Normal BATT VDC ≥ 16.7.
Normal Fan RPM: 18.0 to 20.0K.

Normal BATT VDC ≥ 16.7 .

Normal Fan RPM: 18.0 to 20.0K.

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SUIT P LOW

SUIT P X.X

If 'O2 USE HIGH' message present

1. Go to ABORT EVA, 6. >>

If 'O2 USE HIGH' message not present

2. Continue EVA, monitor SUIT P, SOP P, and gauge.

If gauge < 4.0 and SOP P decreasing

3. Go to TERM EVA, 7. >>

NOTE

Message triggered when SUIT P < 4.05.

SUIT
P HI

SOP P

LOW

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SUIT P HIGH

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

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SUIT P HIGH

SUIT P HIGH	O2 RATE XX.X	SOP RATE XXX
-------------	--------------	--------------

If O2 RATE > 7.0 or SOP RATE > 8

| 1. Go to TERM EVA, 7. >>

If O2 RATE < 7.0 and SOP RATE ≤ 8

| 2. Monitor SUIT P, SOP P, and gauge.

| 3. Continue EVA.

BATT

VDC

SUIT

P LOW

NOTE

Message triggered when SUIT P > 4.55.

Normal O2 RATE ~1.7 psi/min.

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SOP P LOW

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SOP P LOW

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SOP P LOW	SOP P XXX0	SOP RATE XXX
-----------	------------	--------------

1. Go to TERM EVA, 7. >>

NOTE
Message triggered when SOP P < init SOP P – 600
(SOP P initialized at EMU powerup).

O2
USE

SUBLM
PRESS

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O2 USE HIGH

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS)

Page 1 of 1 page

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O2 USE HIGH

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O2 USE HIGH	O2 RATE XX.X
-------------	--------------

If SUIT P LOW message present

1. Go to ABORT EVA, 6.

If O2 P erratic or ~ 0

2. Continue EVA.

3. Recharge O2 periodically.

If O2 RATE > 7.0

4. Go to TERM EVA, 7.

If O2 RATE ≤ 7.0

5. Recharge O2 as required.

6. Continue EVA.

SUIT
P HI
SOP P
LOW

NOTE

Message triggered when

O2 RATE > 10.2 psi/min or

O2 P < 150 and TIME EV < 5 hr.

Normal O2 RATE ≈ 1.7 psi/min.

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SUBLM PRESS

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SUBLM PRESS

SUBLM P XX.X SET H2O OFF

1. √WATER – OFF (fwd)

If SUBLM P < 1.0 and stable

When cooling desired, then:

2. Temp control vlv – Max H

3. WATER – ON (aft)

4. Temp control vlv – as required

If cooling insufficient

5. Go to LOSS OF COOLING, 22, step 2.

If cooling sufficient

6. Continue EVA, monitor SUBLM P and cooling. >>

If SUBLM P ≥ 1.0 and stable (sensor fail)

7. Perform steps 2 to 4, continue EVA, monitor H2O GP/WP and cooling.

NOTE

Message triggered when SUBLM P < 1.5 or > 5.3.
Normal SUBLM P: 2.0 to 4.2.

H2O
GP LO
RESRV
H2O

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H2O GP LOW

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H2O GP LOW

H2O GP LOW

If H2O WP < 13.5 (H2O reg fail)

If cooling insufficient

1. Go to LOSS OF COOLING, 22.

If cooling sufficient

2. Monitor cooling.
3. Continue EVA. >>

If H2O WP ≥ 13.5 (xdcr fail)

4. Monitor H2O WP.

If H2O WP drops to < 12.0

5. Go to TERM EVA, 7.

NOTE

Message triggered when H2O GP < 13.5.

Normal H2O TEMP: 32° to 75° F.

Normal H2O WP: 14.0 to 16.0.

O2
USE
SUBLM
PRESS

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RESRV H2O ON

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

RESRV H2O ON

RESRV H2O ON	TIME LF 'MM
--------------	-------------

H2O GP	H2O WP	ACTION
≈15	≈0	1. Monitor SUBLM P and H2O TEMP (WP xdcr fail).
> 17.0	≈15	2. Monitor H2O WP and H2O TEMP (GP xdcr fail). If H2O WP drops to < 12.0 3. Go to TERM EVA, 7.
≈15	< 12.0	4. Go to TERM EVA, 7 (reserve H2O on).

NOTE

Message triggered when GP minus WP > 2.1 psi.
Normal SUBLM P: 2.0 to 4.2 psia.
Normal H2O TEMP: 32° to 75° F.
Normal H2O GP/WP: 14.0 to 16.0.

NO
VENT
CO2

16 MAY 16

17

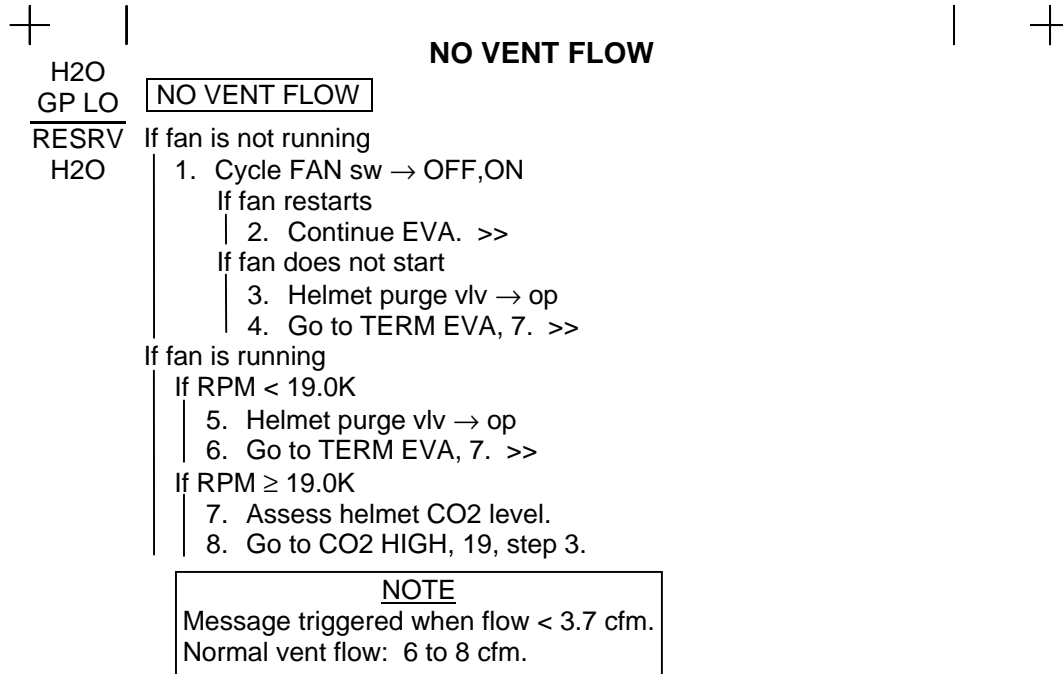
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NO VENT FLOW

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CO2

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

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CO2

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CO2 XX.X MM MONITOR CO2 – PPCO2 > 3.0 MM

1. Minimize physical activity.
2. Assess physical condition then go to step 3 below.

CO2 HIGH OPEN PURGE V – PPCO2 > 8.0 MM

1. √DCM PURGE vlv – cl, √Helmet purge vlv – op
If symptoms noted prior to opening purge vlv
2. Go to TERM EVA, 7. >>
- If no symptoms noted (or inconclusive)
3. Close/open helmet purge vlv as required to assess physical condition for high CO2.
If symptoms noted
4. Helmet purge vlv → op
5. Go to TERM EVA, 7. >>
- If no symptoms noted
6. Helmet purge vlv → cl, locked
7. Monitor physical condition and PPCO2.
8. Continue EVA.

COMM
FAIL
AIR
CONTM

NOTE

Normal PPCO2: 0.2 to 2.0 mm

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COMMUNICATION FAILURE

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS) Page 1 of 1 page

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COMMUNICATION FAILURE			
ALL	1. √Proper config, EMU and ISS (Mode, Volume, Freq)		
	Perform following sequence until communication restored:		
BOTH	If EV crewmember hears intermittent sidetones/		
	communication or no sidetones		
	2. Clear structure to recover communication (signal blockage).		
	If unresolved		
	3. Affected crewmember select ALT(PRI)(notify MCC-H).		
NO VENT CO2			
ISS IV	If IV does not have communication with EV1 and EV2		
PCS	4. If UHF 1 active		
	4.1 C&T: UHF 1: RPCM LAD52B A RPC 08		
	If UHF 2 active		
	4.2 C&T: UHF 2: RPCM LA1B H RPC 04		
	4.3 cmd RPC Position – Open (√Position – Op)		
	4.4 Contact MCC-H for clean up steps		
STS IV	If IV does not have communication with EV1 and EV2		
O6	5. sw EVA STRING → 2(1).		
ALL	If unresolved		
	6. Perform coordinated frequency change.		
	If unable to restore minimum of relay communication		
	7. Go to TERM EVA, 7.		
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AIR FLOW CONTAMINATION

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

AIR FLOW CONTAMINATION

If flow exiting helmet vent contaminated by

Caustic water or LiOH particles

1. Helmet purge vlv → op
2. sw FAN → OFF
3. sw WATER → OFF

If contamination still present

4. Go to ABORT EVA, 6.

If contamination no longer present

5. Go to TERM EVA, 7.

If excessive water in vent loop or helmet

6. Contact **MCC-H**.

NOTE

EMU water tanks hold ~ 1 gallon H₂O.

LOSS
COOL
MISC 1

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LOSS OF COOLING

(ISS EVA SYS/LF1 - ALL/FIN/Paper on ISS)

Page 1 of 1 page

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LOSS OF COOLING

1. Temp Control vlv → cycle 3 to Max C; leave in Max C

If cooling restored, continue EVA >>

2. Begin translation to Airlock for TERMINATE EVA.

If SCU cannot be connected prior to overheating

DCM

3. Helmet purge vlv → Open, lock

4. If vent flow excessively hot
sw FAN → OFF

If helmet purge flow insufficient for cooling

5. Helmet purge vlv → Closed, lock

6. DCM purge vlv → Open

7. SCU →|← DCM

8. √sw FAN – ON

COMM UIA 9. √OXYGEN EMU 1(2) vlv – OPEN

FAIL

If cooling sufficient

AIR

10. √Helmet purge vlv – Closed, locked

CNTM

11. √DCM purge vlv – Closed, locked

If cooling insufficient

12. Perform steps 3 to 6

13. Go to TERM EVA, 7

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MISCELLANEOUS MESSAGES

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS)

Page 1 of 2 pages

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MISCELLANEOUS MESSAGES 1

SUIT P EMERG CLOSE PURG V – SUIT P < 3.1

RLF V FAIL STOP DEPRESS – Stop DEPRESS,
Contact MCC-H,
SUIT P > 5.7.

VENT SW FAIL – Vent flow sensor unreliable.

Built-In Tests

BITE light illuminated – CWS unreliable, contact MCC-H.

LIMITS BAD – Warnings unreliable, monitor status
list, continue EVA.

TIME
LF
IV
HATCH

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MISCELLANEOUS MESSAGES

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS)

Page 2 of 2 pages

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|

MISCELLANEOUS (Cont)/TIME LF

SET O2 EVA
SET O2 PRESS
SET H2O OFF
FAN SW OFF
SET PWR SCU
O2 IS OFF
H2O IS OFF

Verify proper configuration.

Consumables

XX% O2 LF	TIME LF 'MM
XX% PWR LF	TIME LF 'MM

Triggered with 30 minutes of
calculated time remaining for
for limiting consumable.

1. Contact **MCC-H** to confirm calculation.

If no communications with **MCC-H**
| Go to TERM EVA, 7.

LOSS
COOL
MISC 1

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IV HATCH LATCH DISCONNECT

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 1 of 2 pages

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IV HATCH LATCH DISCONNECT

IV BAG – EVA RATCHET, 1/2" SOCKET 8" EXT

1. Inspect latches for debris/damage.
2. Turn crank handle.

If no rotation:

3. Remove PIP pin from all eight tension rods.
 4. Cycle disengaged latch using tension rod for leverage.
 5. If latch does not cycle, remove latch by releasing four captive latch bolts. Secure latch after removal.
 6. If latch does cycle, cycle latch to open position.
7. Hatch → Open

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EV
HATCH

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IV HATCH LATCH DISCONNECT

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS)

Page 2 of 2 pages

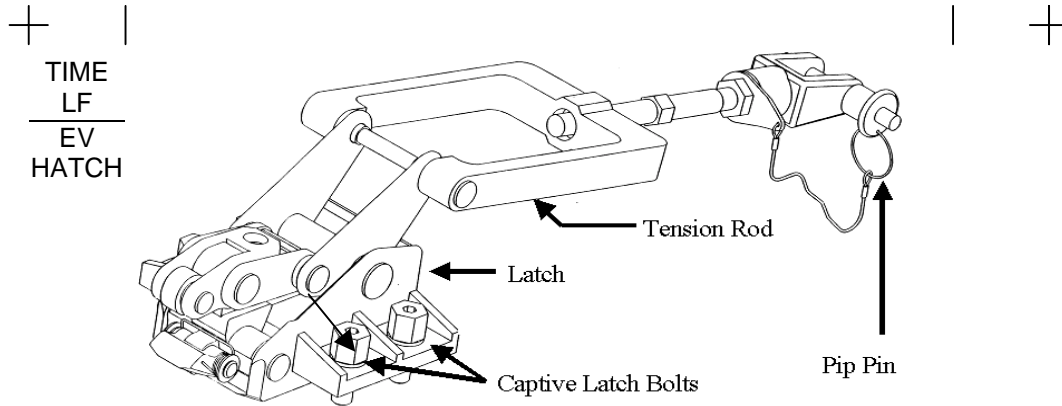


Figure 1.- Tension Rod/Latch Assembly.

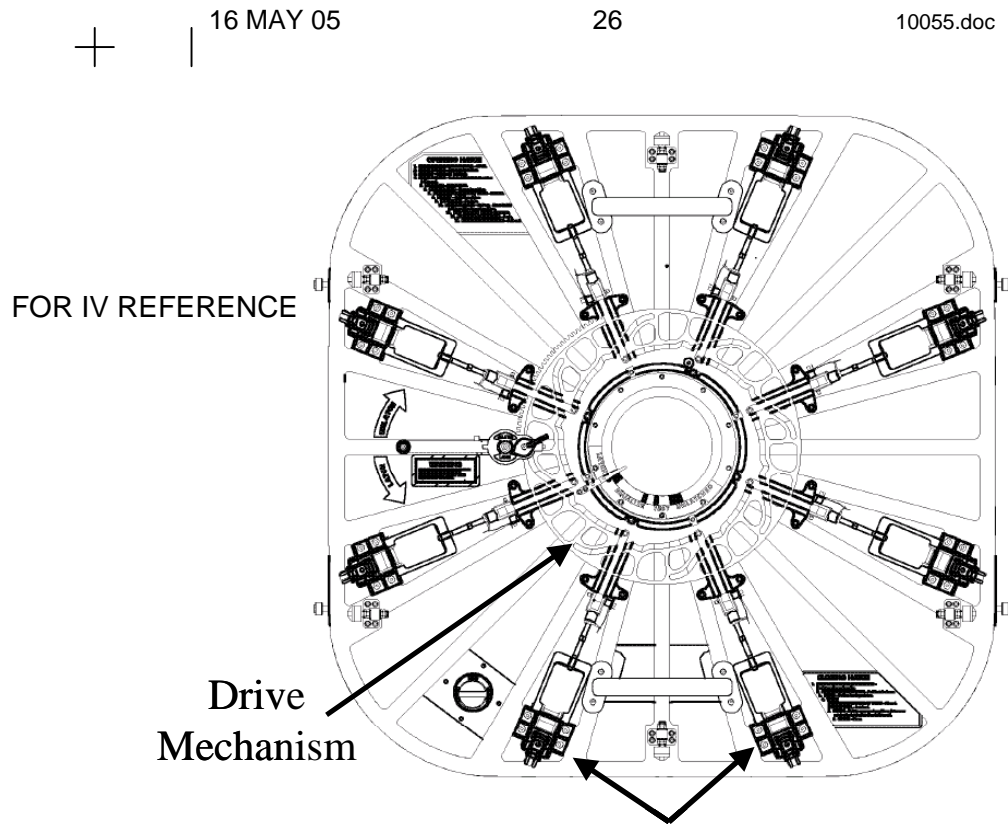


Figure 2.- Tension Rod/Latch Assembly (eight).

EV HATCH LATCH DISCONNECT

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

EV HATCH LATCH DISCONNECT

A/L TOOL BOX – EVA RATCHET, 7/16" SOCKET 6" EXT, ADJ
WRENCH

CETA TOOL BOX – SM TRASH BAG

1. Remove bolt A, stow in trash bag.

2. Rotate actuator handle.

If no rotation – jammed actuator

3. Force latches open.

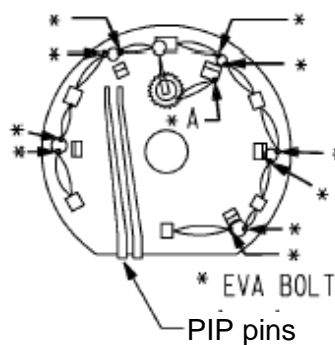
4. Seal hatch with repress and secure.

If free rotation – jammed latch

5. Locate and remove
jam.

6. Reconnect actuator.

EV
HATCH
SSRMS
FRGF



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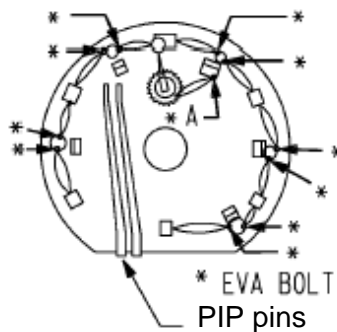
EV HATCH HINGE DISCONNECT

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

EV HATCH HINGE DISCONNECT

1. Remove hinge PIP pins, as required.
2. Restrain hinge arm(s) and PIP pins clear of opening.
3. Ingress airlock, position hatch for closing.
4. Hatch → close, lock

EV
HATCH
LATCH



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SSRMS FRGF RELEASE

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS)

Page 1 of 1 page



SSRMS FRGF RELEASE

CETA TOOL BOX – EVA RATCHET, 1/2" SOCKET 8" EXT, SM TRASH BAG

1. White release rod ↻ (32 strokes of 90 degrees).
2. Black release rod ↻ (32 strokes of 90 degrees – shaft will release from grapple fixture).
3. Clear worksite for SSRMS powerdown.
4. Stow slug in small trash bag.

SSRMS
PDGF
SSRMS
LEE
LATCH



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SSRMS PDGF RELEASE

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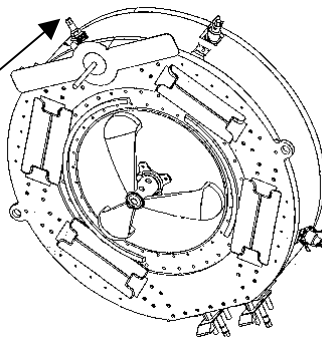
SSRMS PDGF RELEASE

CETA TOOL BOX – EVA RATCHET, 7/16" SOCKET 6" EXT

1. Rotate shaft release mechanism to hard stop (shaft will release from grapple fixture).
2. Clear worksite for SSRMS powerdown.

EV
HATCH
HINGE
SSRMS
FRGF

Shaft release
mechanism



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SSRMS LEE LATCH CONTINGENCY

(ISS EVA SYS/E8 - ALL/FIN/Paper on ISS) Page 1 of 1 page

SSRMS LEE LATCH CONTINGENCY

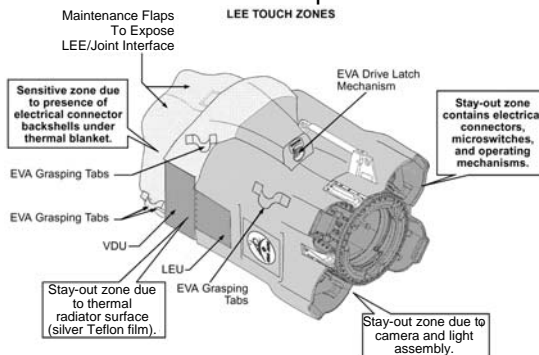
PGT, Right Angle Drive, 7/16" Socket 2" Extension, 6.6 ft-lbs, 30 rpm, 10.5 or

EVA Ratchet, 7/16" Socket 2" Extension

CAUTION

Do not exceed 10.5 ft-lbs against hard stop.

1. To Release LEE Latch
Rotate LEE Latch EVA Drive bolt CCW up to 59.5 turns to hard stop
2. To Engage LEE Latch
Rotate LEE Latch EVA Drive bolt CW up to 59.5 turns to hard stop
3. Clear worksite



SCU
RMVL

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SCU REMOVAL FROM UIA (AT VACUUM)

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 2 pages

SCU REMOVAL FROM UIA (AT VACUUM)

C-Lk IV BAG – EVA Ratchet, 7/16" Socket 6" EXT

- UIA
1. √PWR EV-1,2 switch (two) – OFF
√PWR EV-1,2 LEDs (four) – Off
√WATER SUPPLY EV-1,2 vlv (two) – CLOSE
√OSCA – O2 CLOSED (O2 3AKP)
 2. √**MCC-H** that power and O2 inhibits in place

NOTE

Removal of ОПЛАН caps is technique sensitive.
For removal instructions, the cap is pushed inward and rotated clockwise (opposite the displayed arrow) 1/8 turn; then, the cap is pulled outward.

3. ОПЛАН-I (II) cap 2 ←|→ OSCA
ОПЛАН-I (II) cap 3 ←|→ OSCA
4. OSCA ↻ PRESS (НАДДУВ)
5. √OXYGEN EMU 1,2 vlv (two) – OPEN
6. OXYGEN ORLAN vlv → OPEN
7. √EMU O2 SUPPLY PRESS gauge ≅ 0
√ORLAN O2 SUPPLY PRESS gauge ≅ 0

SSRMS
PDGF
SSRMS
LEE
LATCH

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SCU REMOVAL FROM UIA (AT VACUUM)

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 2 of 2 pages

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|

SCU REMOVAL FROM UIA (AT VACUUM, CONT'D)

8. OSCA ↺ O2 CLOSED (O2 3AKP)
9. ОПЛАН-I (II) cap 2 → | ← OSCA
ОПЛАН-I (II) cap 3 → | ← OSCA
10. OXYGEN EMU 1,2 vlv (two) → CLOSE
11. OXYGEN ORLAN vlv → CLOSE
12. Mating bolts (two) ↺ using ratchet with 7/16" socket
(≅15 turns each).
13. Strain relief hooks (two) ←|→ tether points (two) on
C-Lk wall
14. Remove SCU from stowage straps on C-Lk wall.
15. Remove stowage pouches from C-Lk restraint straps
(leave DCM connectors inside pouches).
16. Stow 7/16" socket with 6" extension (in socket caddy)
and EVA ratchet in C-Lk IV Bag.

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C-LK
EGRSS
C-LK
INGRS

+

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CREWLOCK EGRESS

(ISS EVA SYS/7A - ALL/FIN 1/Paper on ISS) Page 1 of 1 page

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|

CREWLOCK EGRESS

|

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SCU
RMVL

EV1

1. Thermal cover → open
2. Egress Crewlock.
3. Verify hook locks installed in safety tether hooks on external D-rings.
4. Safety tether short strap →|← EMU D-ring or extender, double tether to reel, unlock reel
5. Waist tether ←|→ internal Crewlock D-ring, stow on EMU or clear of hatch opening

EV2

6. Repeat steps 1 to 5
7. Thermal cover → close

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CREWLOCK INGRESS

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS) Page 1 of 1 page

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CREWLOCK INGRESS

- BOTH 1. Complete Tool Inventory.
- 2. √Tool Boxes closed, latched
- EV2 3. Waist tether →|← internal Crewlock D-ring
- 4. Safety tether short strap ←|→ EMU
Safety tether short strap →|← external hatch handrail
- 5. √Reel unlocked, retract cable slack
- 6. Ingress Crewlock.
- 7. Retrieve SCU, remove DCM cover.
SCU →|← DCM, √Locked
- EV1 8. Repeat steps 3 to 7.
- BOTH 9. sw WATER → OFF (fwd)
- 10. Thermal cover → close
Attach Velcro strap.

CAUTION

Do not close hatch until EMU
WATER – OFF for 2 minutes.

- 11. √EV hatch clear of FOD and obstructions.
- 12. EV hatch → close and lock
- 13. Go to PRE REPRESS portion of {CREWLOCK
DEPRESS/REPRESS CUE CARD} (SODF: ISS EVA
SYS: EVA PREP/POST).

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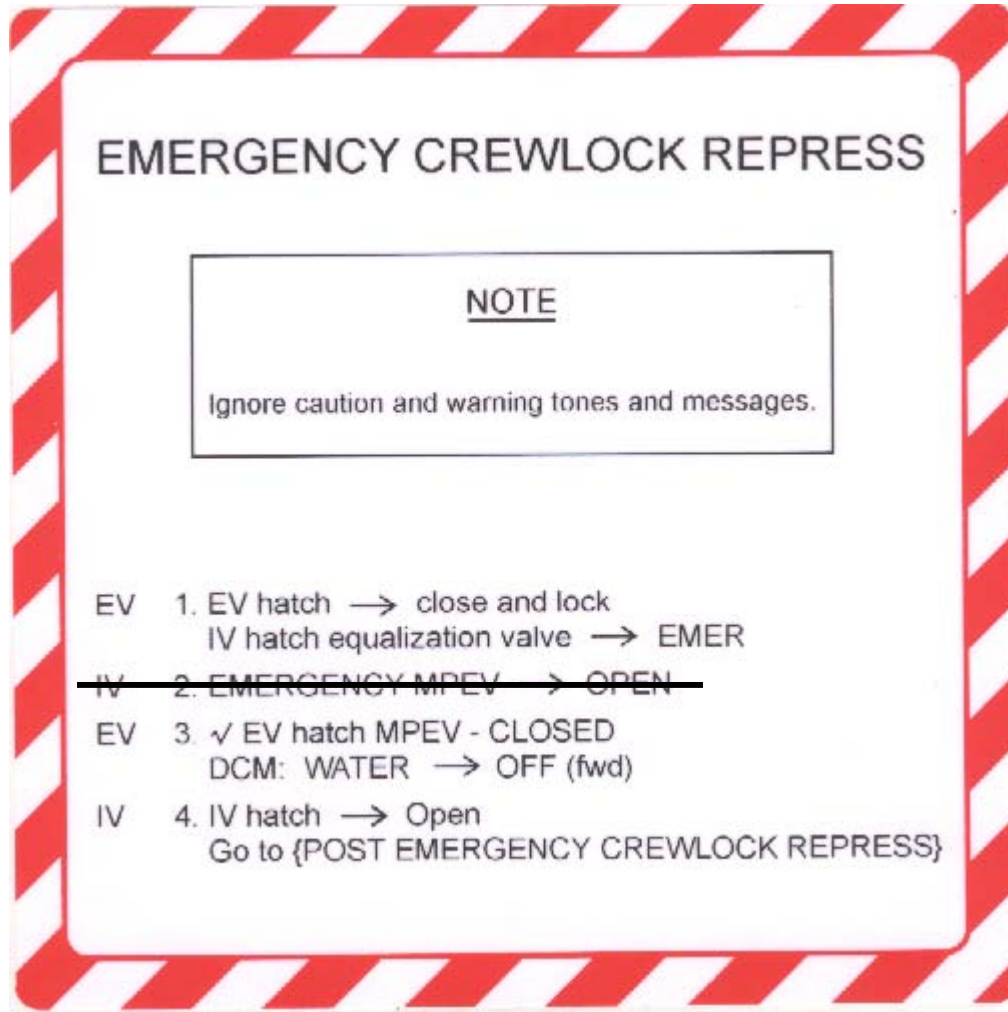
4.105 EMERGENCY CREWLOCK REPRESS

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 1 of 1 page

OBJECTIVE:

In an emergency, these steps need to be performed for a rapid Emergency Crewlock Repress. This decal is posted on the inside of the EV hatch and on both sides of the IV hatch.



Go to {4.110 POST EMERGENCY CREWLOCK REPRESS} (SODF: ISS EVA SYS: EMERGENCY).

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4.110 POST EMERGENCY CREWLOCK REPRESS

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 1 of 1 page

I

(10 Minutes)

OBJECTIVE:

Following an Emergency Crewlock Repress, this procedure safely configures both EV crewmembers in their suits. Different steps are taken for the affected crewmember and the unaffected crewmember.

WARNING

This procedure should not be performed following a Cuff 4 DCS incident. If a Cuff 4 DCS incident, go to {4.120 DCS TREATMENT}, all (SODF: ISS EVA SYS: EMERGENCY).

AFFECTED CREWMEMBER

- DCM 1. PURGE vlv → op (up)
2. O2 ACT → OFF
3. √STATUS: SUIT P < 0.4 (compare with guage)
4. Gloves ←|→ EMU
5. Helmet ←|→ HUT
- DCM 6. SCU →|← DCM
- UIA 7. sw PWR EV-1(2) → ON
- √PWR EV-1(2) EMU LED – On
√PWR EV-1(2) VOLTS: 18.0 to 19.0
- DCM 8. sw POWER → SCU
- If single crewmember aborting EVA
- IV 9. √**MCC-H** for further steps >>

UNAFFECTED CREWMEMBER

- DCM 10. O2 ACT → IV
11. SCU →|← DCM
- UIA 12. sw PWR EV-1(2) → ON
- √PWR EV-1(2) EMU LED – On
√PWR EV-1(2) VOLTS: 18.0 to 19.0
- DCM 13. sw POWER → SCU
14. √**MCC-H** for further steps

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4.115 EXPEDITED SUIT DOFFING

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 1 of 2 pages

(20 Minutes)

OBJECTIVE:

Doff the EMU in a fast, yet safe manner. Performed in case of an emergency.

CAUTION

Verify EV crew is clear of hatch mechanism.

IV

When equalization complete

1. Open IV Hatch per decal.

IV Hatch equalization valve → OFF

* If required, IV use damp towel to clean gloves.

SAFER DOFFING (5 MINUTES)

SAFER
IV

2. Latch → ENG

3. Latch ↺ until release (~ 90 deg)

4. PLSS ←|→ Thruster Towers

SUIT DOFFING (10 MINUTES)

DCM

5. O2 ACT → OFF

6. PURGE vlv → op (up)

7. Engage EMU in EDDA.

PLSS

If EMU TV capability

8. EMU TV Power Cable ←|→ EMU TV

DCM

9. √STATUS: SUIT P < 0.4 (compare with gauge)

Gloves ←|→ EMU

10. Helmet ←|→ EMU

DCM

11. sw FAN → OFF

12. Waist Ring ←|→ HUT

13. LCVG ←|→ Multiple Water Connector

14. Biomed Pigtail ←|→ Electrical Harness

15. Doff comm cap.

4.115 EXPEDITED SUIT DOFFING

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 2 of 2 pages

16. Doff HUT.

17. Doff LTA.

If taking EMUs to shuttle

- | | |
|-----|---|
| UIA | <p>18. Waist ring → ← HUT</p> <p>19. Gloves → ← EMU</p> <p>20. sw PWR EV-1,2 (two) → OFF</p> <p style="padding-left: 20px;">√PWR EV-1,2 LEDs (four) – Off</p> <p>21. Remove Metox from EMUs (not required if LiOH is installed).</p> <p>22. PLSS thermal cover on back of EMU → close</p> |
| DCM | <p>23. SCU ← → DCM</p> <p>24. Install helmet and helmet cover.</p> <p>25. Transfer EMU to shuttle.</p> |

EMU/AIRLOCK CONFIGURATION

When time permits

- | | |
|-----|--|
| DCM | <p>26. IV Hatch equalization valve → OFF</p> <p>27. Install WATER switch guards (two).</p> <p>28. √sw Glove heater (two) – OFF</p> <p>29. Stow lower arm and glove cable connectors under TMG.</p> |
|-----|--|

If EMU TV capability

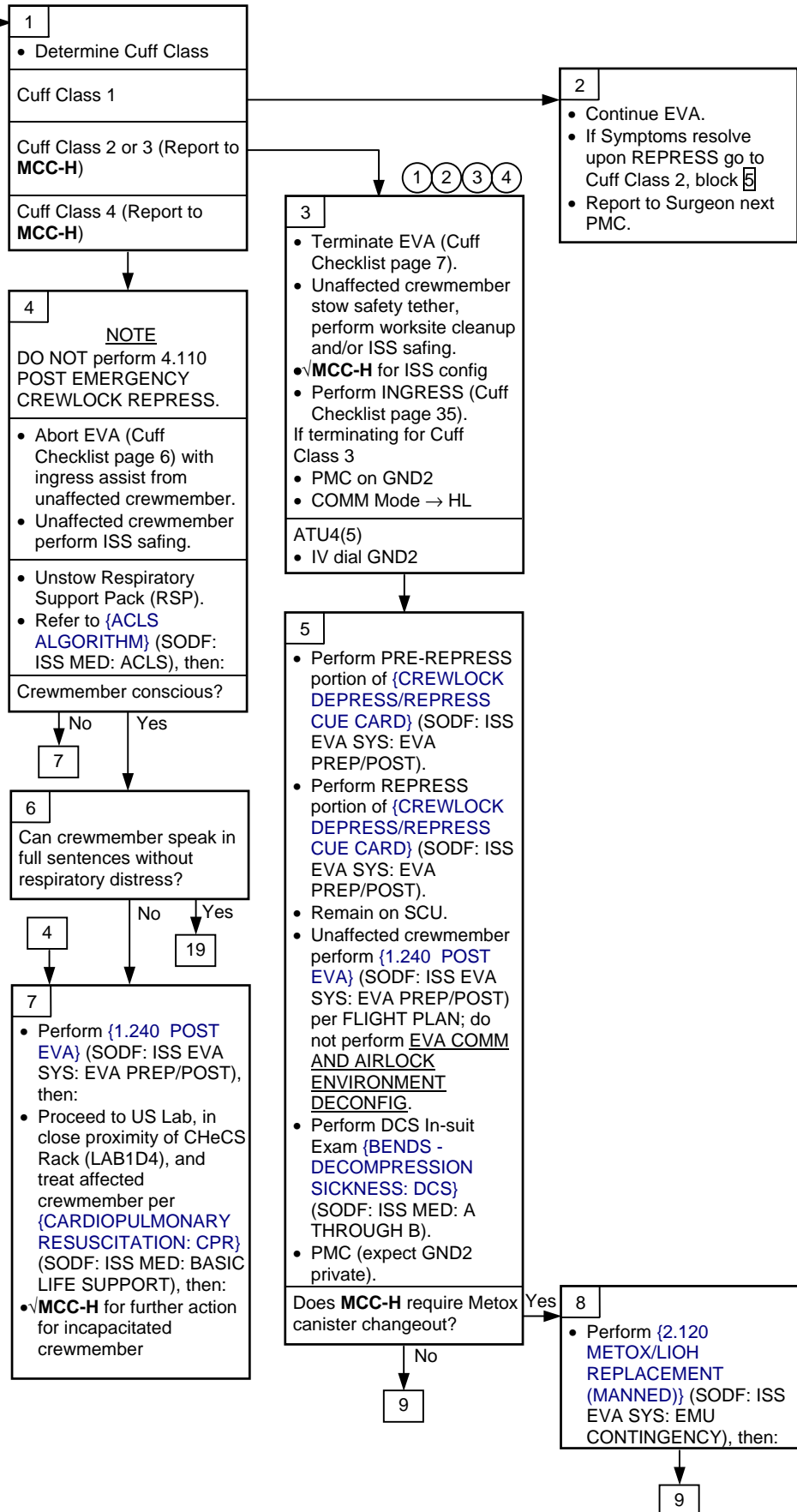
30. EMU TV Power Cable →|← Ground Plug
31. Go to {1.240 POST EVA}, step 28 (SODF: ISS EVA SYS: EVA PREP/POST).

4.120 DCS TREATMENT

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 1 of 4 pages

DCS Signs and Symptoms Associated with Each Cuff Class Defined in Cuff Checklist



1 EVA terminated to prevent progression to Cuff Class 4. If Cuff 2, affected crewmember will assist other EV with minor worksite cleanup, if possible, to expedite cleanup and then terminate EVA.

2 If estimated time reqd for DCS treatment exceeds Metox canister consumables, a changeout should be performed. If **10** or **12** required, minimum treatment is ~3 hours.

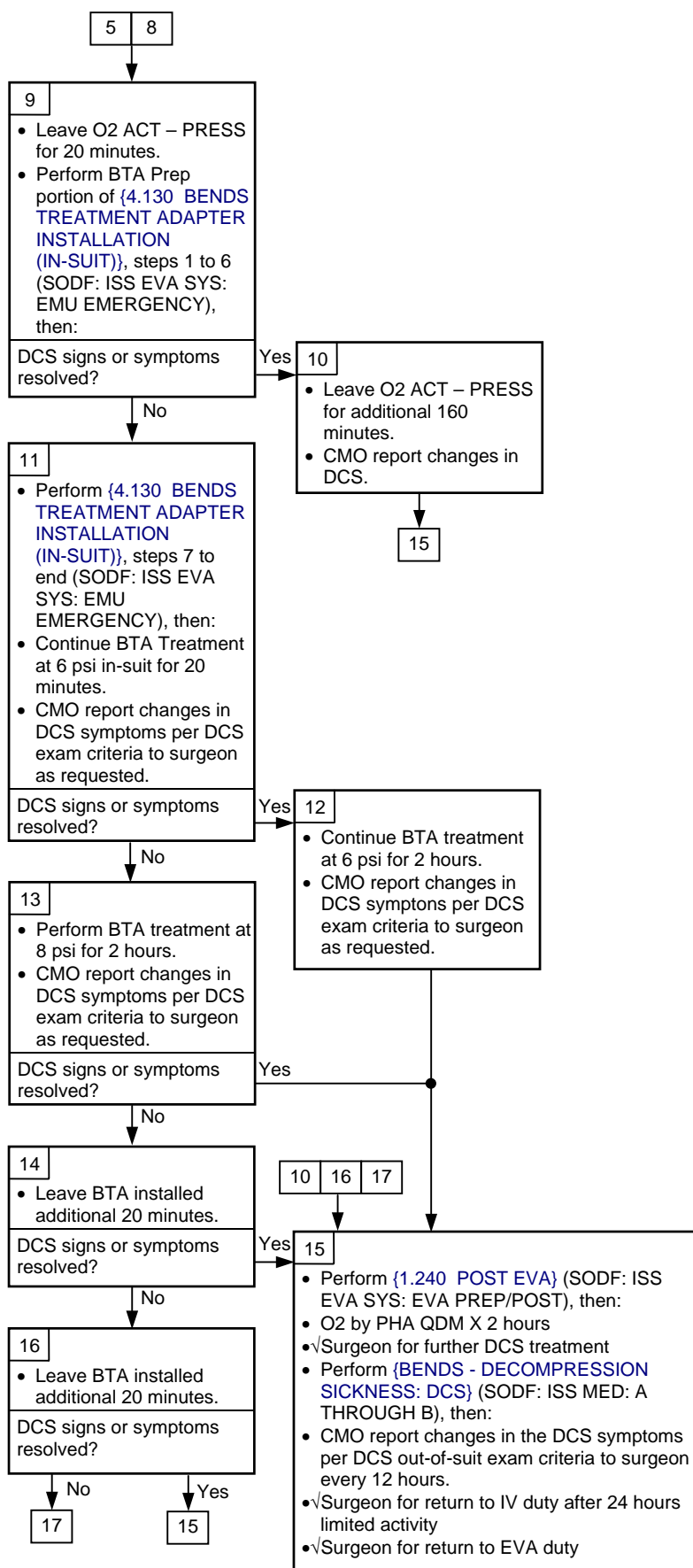
3 For Cuff Class 3 only, affected crewmember waiting in Crewlock needs to be in contact with surgeon via PMC due to severity and potential progression of symptoms.

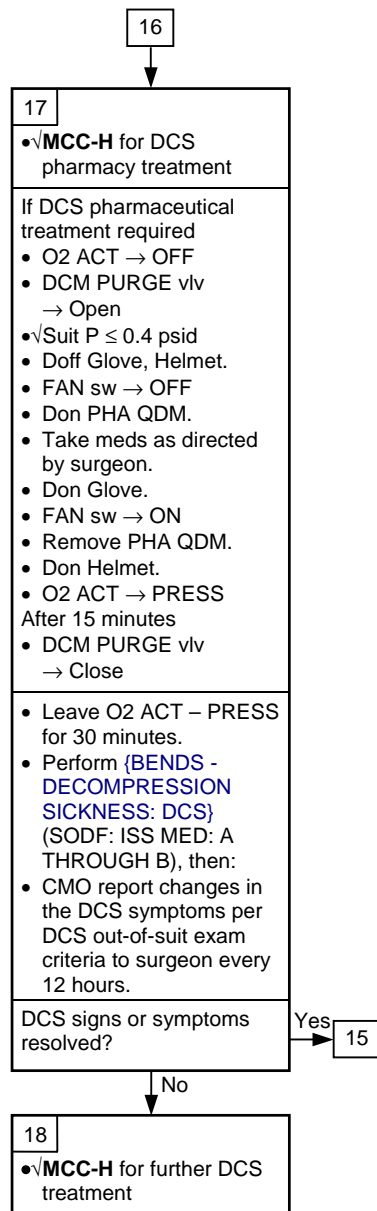
4 Cuff Class 4 symptoms may be secondary to Type 2 DCS which is a medical emergency. Unstowing the resuscitator enables IV crew to be prepared to administer CPR, if required. Because it is critical to repress a Class 4 quickly, this may result in a one crewmember repress.

4.120 DCS TREATMENT

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 2 of 4 pages

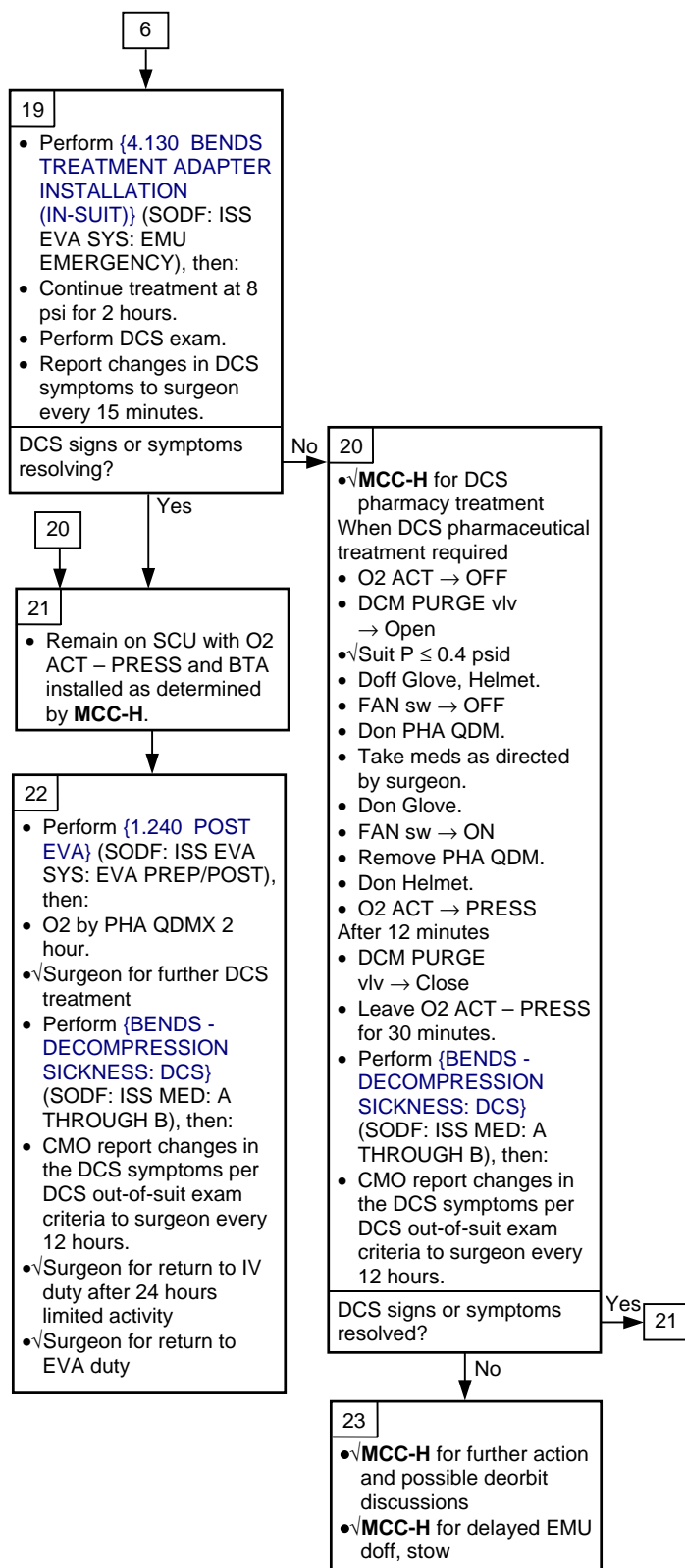




4.120 DCS TREATMENT

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 4 of 4 pages



4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 1 of 7 pages

(60 Minutes)

OBJECTIVE:

To install the Bends Treatment Adaptor (BTA) for Decompression Sickness (DCS) treatment. Performed if symptoms confirmed post suit doffing.

BTA PREP (10 MINUTES)

1. Unstow BTA and 3/8" Wrench.
 - PLSS 2. Cut/break TMG tacks.
Refer to Figure 1.
 3. Unzip PLSS TMG (avoid pulling on antenna cable).
 4. Remove Impact Shield.
Disconnect hatch marked cable P3 (cut cable if required).
Refer to Figure 1.
 5. Remove Test Port F Plug on SOP using 3/8" end of BTA Wrench
(4 to 6 turns ↺).
Refer to Figure 2.
 - BTA 6. Stow Test Port F Plug on BTA.
Refer to Figure 1.
- If Metox (LiOH) canister replacement required by **MCC-H**
7. Unstow new Metox (LiOH) canister.
 8. Remove used Metox (LiOH) canister.
 9. Install new Metox (LiOH) canister using label on canister for proper orientation.
Report Metox canister barcode to **MCC-H** as comm permits.
 10. Install caps on used Metox (LiOH) canister.
Temporarily stow canister for future regeneration.
Tape an 'X' on the used LiOH canister and stow.

BTA TREATMENT (50 MINUTES)

11. √SCU →|← DCM
- BTA 12. Unstow Poppet Keeper Screw from BTA.
- PLSS 13. Open Positive Pressure Relief Valve (PPRV) using BTA poppet keeper
(thread ↻, pull, tighten nut).
Refer to Figure 1.
14. Align BTA Engage mark with PPRV Mark.

BTA →|← PPRV (rotate BTA ↻ to Lock)

√BTA Locked

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 2 of 7 pages

15. Don MAG, LCVG, biomed.
16. Fill Drink Bag, remove gas.
Insert bag in Restraint Bag.
Install Drink Bag, Restraint Bag in HUT.
Dispose of fill tool in EMU Equipment Bag trash.

UIA 17. √OXYGEN EMU 1(2) vlv – OPEN

DCM 18. sw POWER → BATT

CAUTION
EMU must be on BATT power when UIA suit power is turned on.

PSA 19. √sw SUIT SELECT – OFF
√sw EMU MODE EMU1(2) – PWR

20. sw MAIN POWER → ON

√MAIN POWER LED – On

21. sw SUIT SELECT → EMU 1(2)

√EMU 1(2) LED – On

√EMU 1(2) Volts: 18.0 to 19.0

UIA 22. sw PWR EV-1(2) → ON

√PWR EV-1(2) EMU LED – On

DCM 23. sw POWER → SCU

24. √Waist ring – op

25. Don LTA (attach donning handles as required).

26. √Suit arms aligned

√Wrist disconnects – op

27. Don thumb loops.

28. √Biomed connector outside of HUT

29. Don HUT.

Release thumb loops.

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 3 of 7 pages

30. ✓ Suit arms aligned

31. Don comm cap.

32. ✓ sw COMM mode – HL (vol as required)

If biomed downlink desired

MCC-H/IV
PCS

33. CONFIGURING FOR EMU COMM

33.1 Powering Up UHF 1 for EVA Operations on 414.2 MHz
Perform {2.701 UHF 1 ORU ACTIVATION}, steps 1 to 16
(SODF: C&T: NOMINAL: UHF), then:

33.2 Configuring Audio Subsystem for EVA Operations
Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION
FOR UHF OPS}, steps 1 to 11 (SODF: C&T: NOMINAL:
AUDIO), then:

DCM

34. sw COMM mode → PRI

35. sw Comm FREQ → LOW

36. Biomed pigtail →|← electrical harness

37. LCVG →|← Multiple Water Connector

✓ Multiple Water Connector locked

38. ✓ Thermal cover clear of waist ring

39. Waist ring → engage position
Waist ring →|← HUT

✓ Waist ring locked

40. Wrist ring → engage position

41. Don EV gloves.

✓ EV gloves locked

42. ✓ Mic boom position

DCM

43. sw FAN → ON

44. ✓ Electrical harness clear of neck ring

45. Don helmet.

✓ Helmet locked

46. ✓ Helmet purge vlv – Closed, locked

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 4 of 7 pages

DCM 47. √PURGE vlv – Op (up)

48. O2 ACT → PRESS, begin purge clock (12 minutes)

Record start of purge clock.

GMT (PURGE START) ____/____:____ ____

PCS 49. Verifying Condensate Tank Configuration

Lab: ECLSS: H2O Vent

Lab Water Vent

√Water Vent System Status – Inhibited

If Water Vent System Status – Enabled

√**MCC-H**

√Condensate Tank Qty 1(2) < 42.5 kg

If Condensate Tank Qty 1(2) > 42.5 kg

√**MCC-H**

UIA 50. √WATER EV-1(2) SUPPLY vlv – CLOSE

51. WATER EV-1(2) REG vlv → WASTE

When 12-minute purge complete and H2O WP < 7 and stable for ~ 1 minute

52. WATER EV-1(2) REG vlv → SUPPLY

GMT (PURGE END) ____/____:____ ____

DCM 53. PURGE vlv → CI (dn)

54. √STATUS: SUIT P: 4.2 to 4.4

NOTE

Suit P will increase about ~ 0.5 psi each time the O2 Act → OFF.

55. O2 ACT → OFF (until Suit P stabilizes)

56. O2 ACT → PRESS (for 15 seconds)

57. Repeat steps 55,56 until Suit P = 6.0 psig on BTA gauge.

NOTE

BTA relief valve relieves at 8.04 to 8.45 psig.

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 5 of 7 pages

58. Repeat steps 55,56 as required to maintain SUIT P = 6.0 psig.

NOTE

Initial treatment will be at 6 psid for Cuffs 2 and 3 and will be increased to 8 psid if symptoms do not resolve. Initial treatment for Cuff 4 will be 8 psid.

59. Contact Surgeon (**MCC-H**) for treatment length and changes in treatment pressure.

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 6 of 7 pages

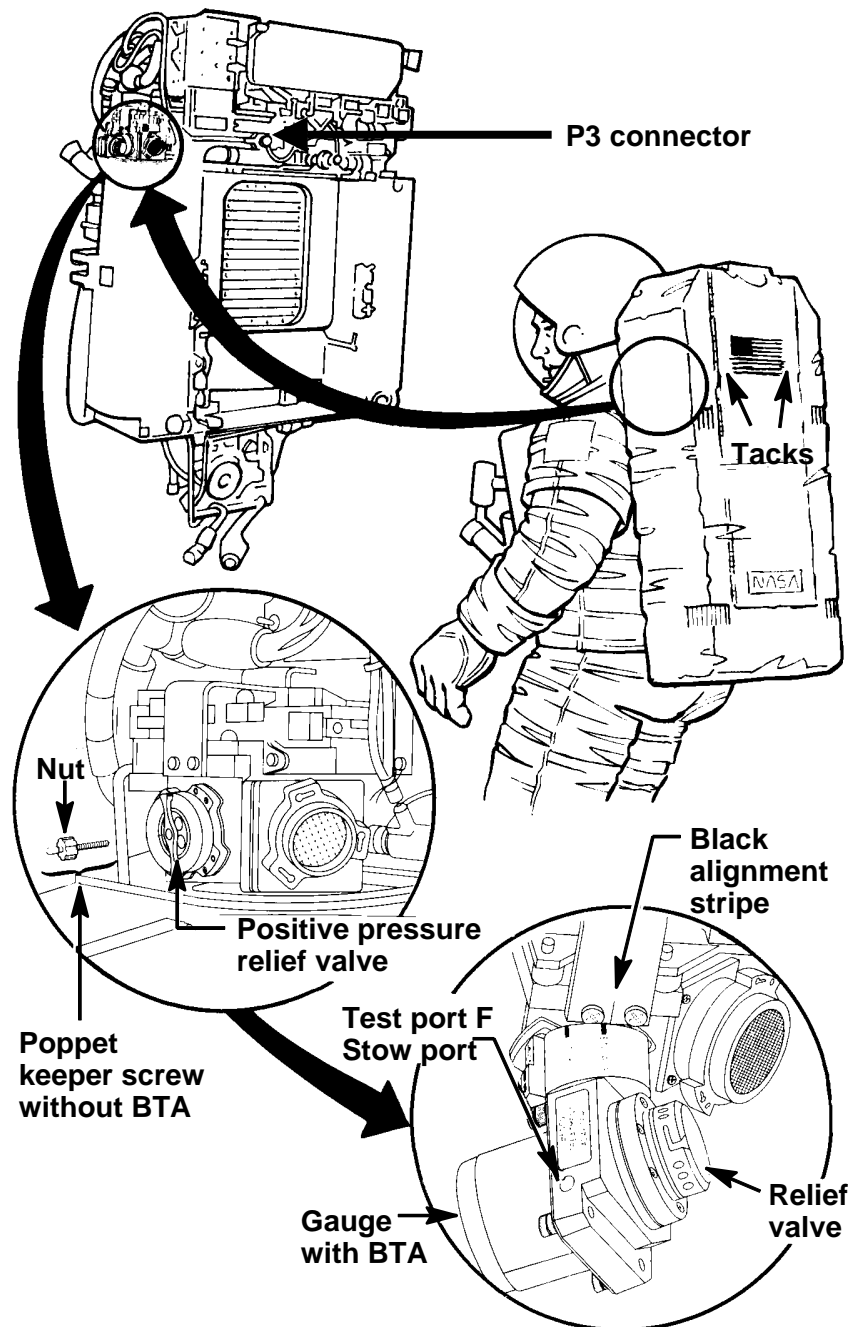


Figure 1.- BTA Location on EMU.

4.125 BENDS TREATMENT ADAPTER INSTALLATION (POST SUIT DOFFING)

(ISS EVA SYS/7A - ALL/FIN 3/Paper on ISS)

Page 7 of 7 pages

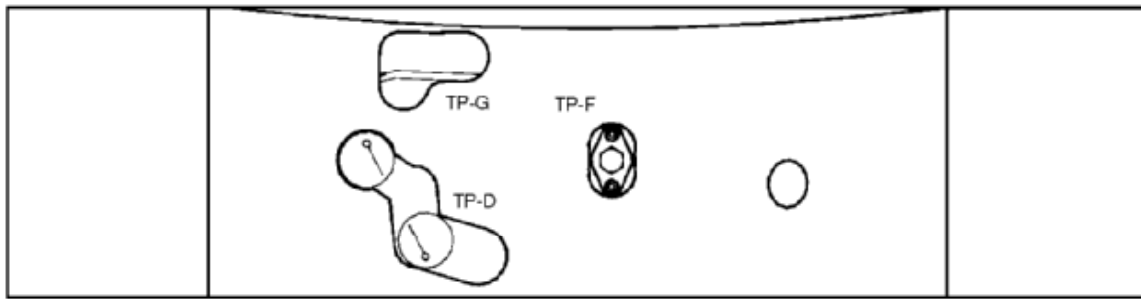


Figure 2.- Secondary Oxygen Package.

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4.130 BENDS TREATMENT ADAPTER INSTALLATION (IN-SUIT)

I

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 1 of 4 pages

(70 Minutes)

OBJECTIVE:

To install the bends treatment adapter (BTA) for BTA operations. Performed while the crewmember remains pressurized in the suit.

BTA PREP (10 MINUTES)

- | | |
|------|---|
| | 1. Unstow BTA and 3/8" Wrench. |
| PLSS | 2. Cut/break TMG tacks.
Refer to Figure 1. |
| | 3. Unzip PLSS TMG (avoid pulling on antenna cable). |
| | 4. Remove Impact Shield.
Disconnect hatch marked cable P3 (cut cable if required).
Refer to Figure 1. |

NOTE

It may be necessary to extend the legs forward to access the test port in a pressurized EMU.

- | | |
|-----|---|
| | 5. Remove Test Port F Plug on SOP using 3/8" end of BTA Wrench (4 to 6 turns ↺).
Refer to Figure 2. |
| BTA | 6. Stow Test Port F Plug on BTA.
Unstow poppet keeper screw from BTA, stow in EMU Servicing Kit.
Refer to Figure 1. |

BTA TREATMENT (60 MINUTES)

- | | |
|-----|--|
| DCM | 7. √SCU → ← DCM |
| | 8. Align BTA Engage mark with PPRV Mark.
BTA → ← PPRV (rotate BTA ↻ to Lock)

√BTA locked |
| UIA | 9. √OXYGEN EMU 1(2) vlv – OPEN |
| DCM | 10. √sw POWER – SCU |
| | 11. √sw FAN – ON |
| | 12. √sw COMM mode – HL (vol as required) |

4.130 BENDS TREATMENT ADAPTER INSTALLATION (IN-SUIT)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 2 of 4 pages

- If biomed downlink desired
- MCC-H/IV**
PCS
13. CONFIGURING FOR EMU COMM
- 13.1 Powering Up UHF 1 for EVA Operations on 414.2 MHz
Perform {2.701 UHF 1 ORU ACTIVATION}, steps 1 to 16
(SODF: C&T: NOMINAL: UHF), then:
- 13.2 Configuring Audio Subsystem for EVA Operations
Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION FOR UHF OPS}, steps 1 to 11 (SODF: C&T: NOMINAL: AUDIO), then:
- DCM
14. sw COMM mode → PRI
15. sw Comm FREQ → LOW
- PCS
16. Verifying Condensate Tank Configuration
Lab: ECLSS: H2O Vent
Lab Water Vent
- √Water Vent System Status – Inhibited
- If Water Vent System Status – Enabled
√**MCC-H**
- √Condensate Tank Qty 1(2) < 42.5 kg
- If Condensate Tank Qty 1(2) > 42.5 kg
√**MCC-H**
- UIA
17. √WATER EV-1(2) SUPPLY vlv – CLOSE
18. WATER EV-1(2) REG vlv → WASTE
- DCM
- When H2O WP < 7 and stable for ~ 1 minute
- UIA
19. WATER EV-1(2) REG vlv → SUPPLY
- DCM
20. √STATUS: SUIT P: 4.2 to 4.4
21. O2 ACT → OFF (until SUIT P stabilizes)

NOTE

Suit pressure will nominally increase when the O2 actuator is taken to OFF. SUIT P = H2O GP when the O2 ACT – OFF. For actual SUIT P > 5.9 psi, SUIT P can be directly read only as the H2O GP; actual SUIT P = 4.7 to 5.5 psi above BTA gauge pressure.

4.130 BENDS TREATMENT ADAPTER INSTALLATION (IN-SUIT)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 3 of 4 pages

CAUTION

If BTA gauge pressure increases while O2 ACT – PRESS, set O2 ACT – OFF immediately to prevent a hazardous condition; contact **MCC-H**.

22. O2 ACT → PRESS (for 15 seconds), monitor BTA gauge not increasing
23. O2 ACT → OFF (until H2O GP stable)
24. Repeat steps 22 and 23 until H2O GP = 6.0 psid on DCM display with O2 ACT – OFF.
25. Repeat steps 22 and 23 as required to maintain H2O GP = 6.0 psid.

NOTE

Initial treatment will be at 6 psid for Cuffs 2 and 3 and will be increased to 8 psid if symptoms do not resolve. Initial treatment for Cuff 4 will be 8 psid.

26. Contact Surgeon (**MCC-H**) for treatment length and changes in treatment pressure.

4.130 BENDS TREATMENT ADAPTER INSTALLATION (IN-SUIT)

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS) Page 4 of 4 pages

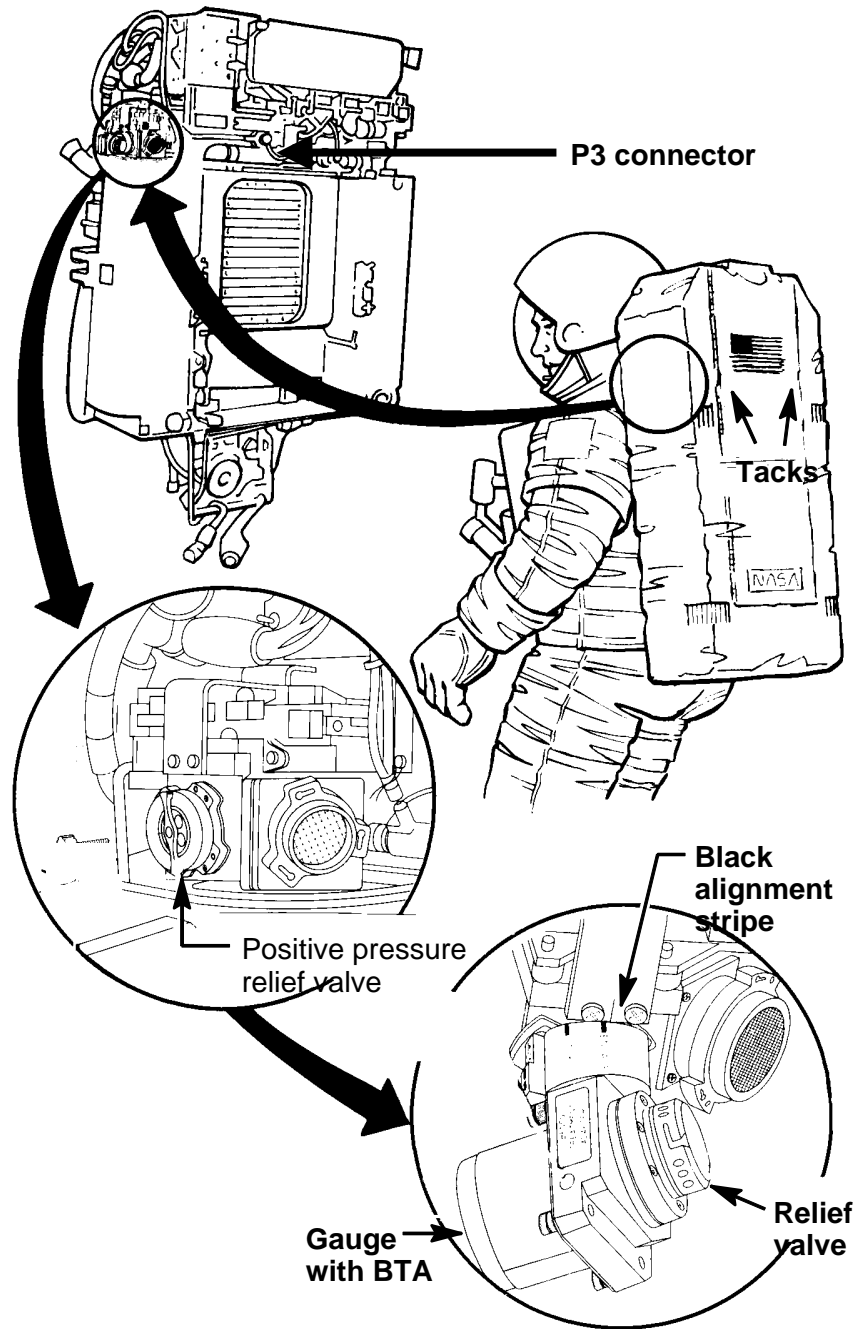


Figure 1.- BTA Location on EMU.

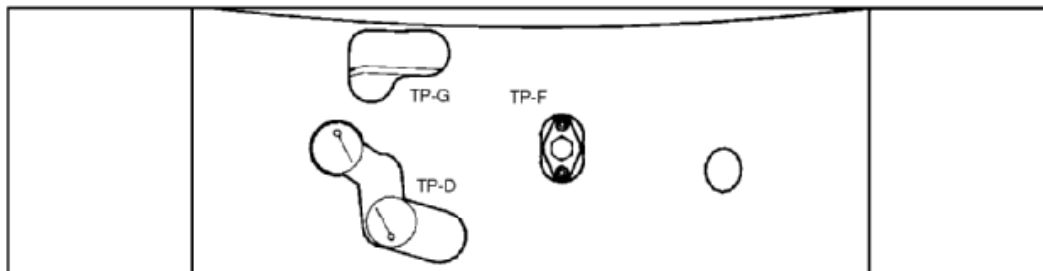


Figure 2.- Secondary Oxygen Package.

4.135 SAFER RESCUE

(ISS EVA SYS/7A - ALL/FIN 2/Paper on ISS)

Page 1 of 1 page

I

OBJECTIVE:

To return a separated EV crewmember back to the vehicle using the Simplified Aid For EVA Rescue (SAFER). The IV crewmember will be reading the steps to the separated EV crewmember.

1. Deploy SAFER HCM.

HCM 2. sw PWR → ON

3. Fly to vehicle.
Monitor GN2 % and PWR %.

* If no gas flow

* √MAN ISOL vlv – OP (dn)

IV/
other EV 4. Provide GCA

IV 4.1 Provide range and range rate using Laser Range Finder, as required.

4.2 Configure WVS and ISS external cameras to assist separated EV crew.

4.3 Turn on external vehicle lights, as required.

EV 5. Tether to nearest structure.

√Connection

6. Tether to available safety tether or other EV crewmember.

√Connection

HCM 7. sw PWR → OFF

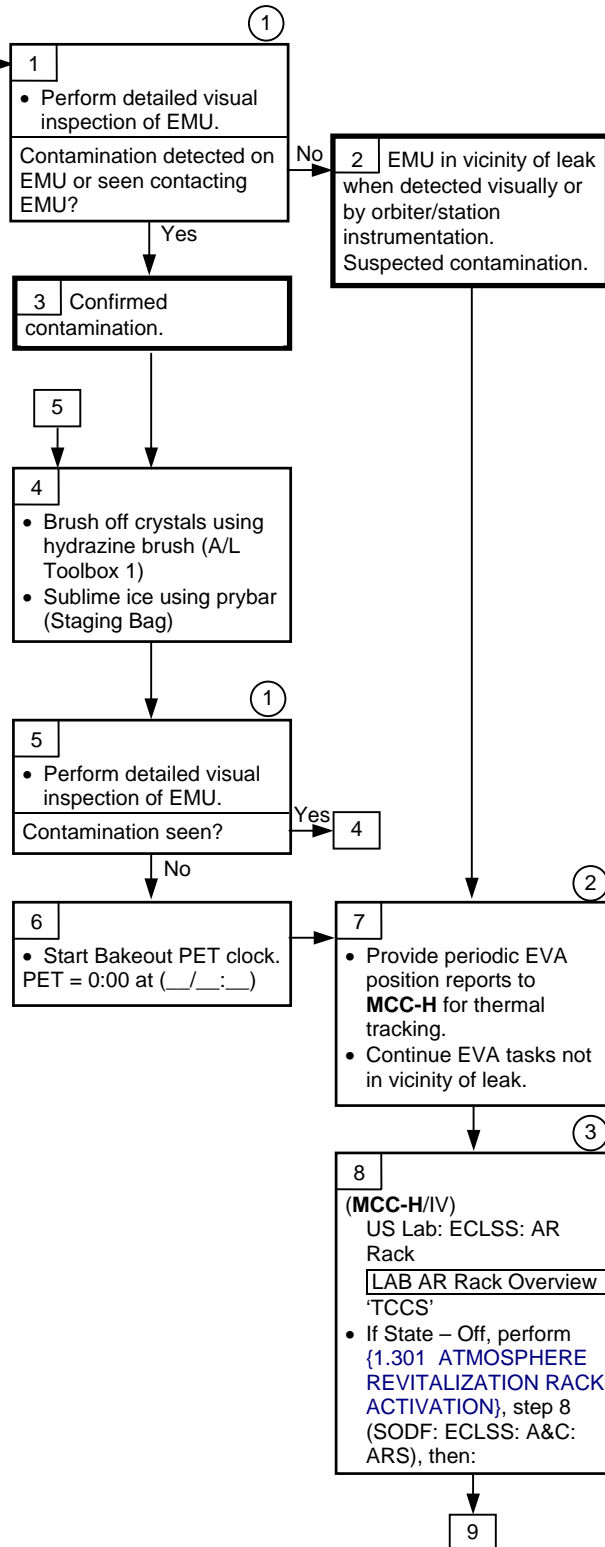
8. MAN ISOL vlv → CL (up)

9. √**MCC-H**

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Crew Visually
Detects Plume,
Leaking QD,
White Crystals,
or "Snow"
Coming from
Orbiter/Station
During EVA

Orbiter/Station
Chemical
System Leak
Suspected Due
to Steady (not
Step Function)
Decrease in
Pressure or
Temperature



①

Ammonia visual inspection should be performed in night or shaded ambient light with helmet spot lights used to illuminate TMG. Use of sun visor during inspection should be avoided. View TMG from an oblique angle. The following are indications of ice on the EMU:

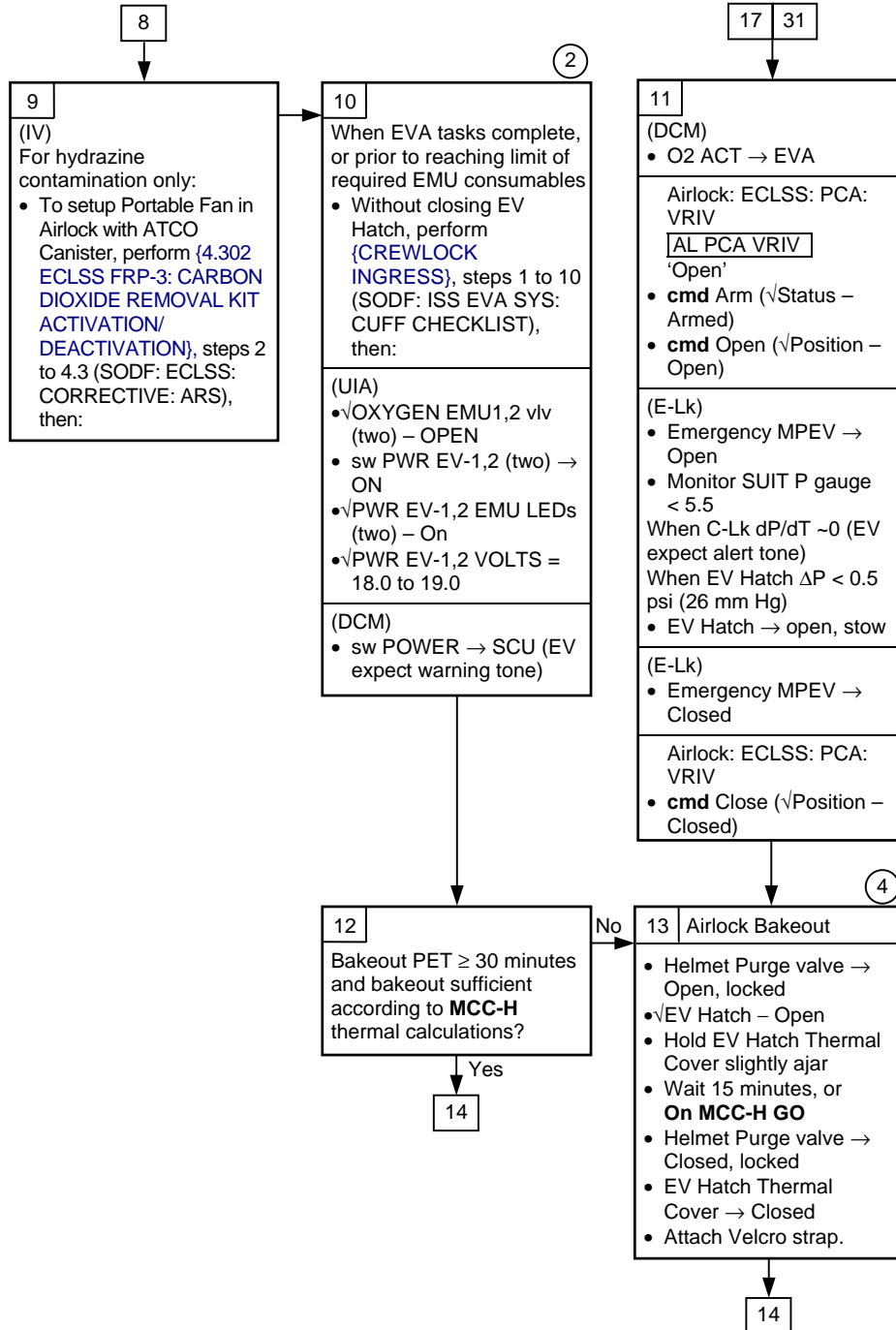
- Loss of TMG thread pattern.
- Waxy gloss or hard pack snow appearance.
- Unusual contours.

②

For confirmed contamination 2:00 (2:15 if from ISS thruster) of EMU consumables must be available to support activities from ingress through EMU doffing. For suspected contamination 0:55 (1:10 if from ISS thruster) of consumables required. EVA tasks must be deferred to protect these consumables. Bakeout on SCU does not consume Metox/LiOH if Helmet Purge valve is open.

③

All displays in this procedure are on the PCS, unless otherwise noted.

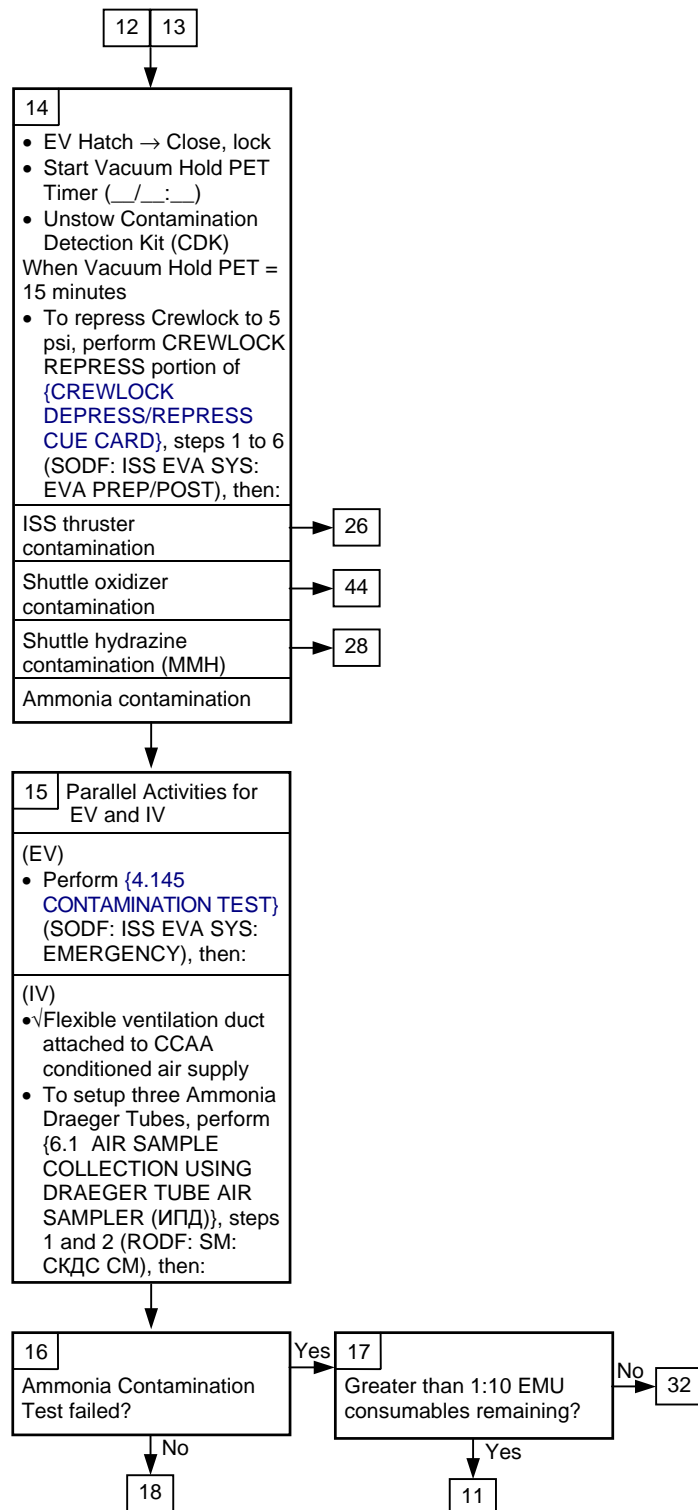


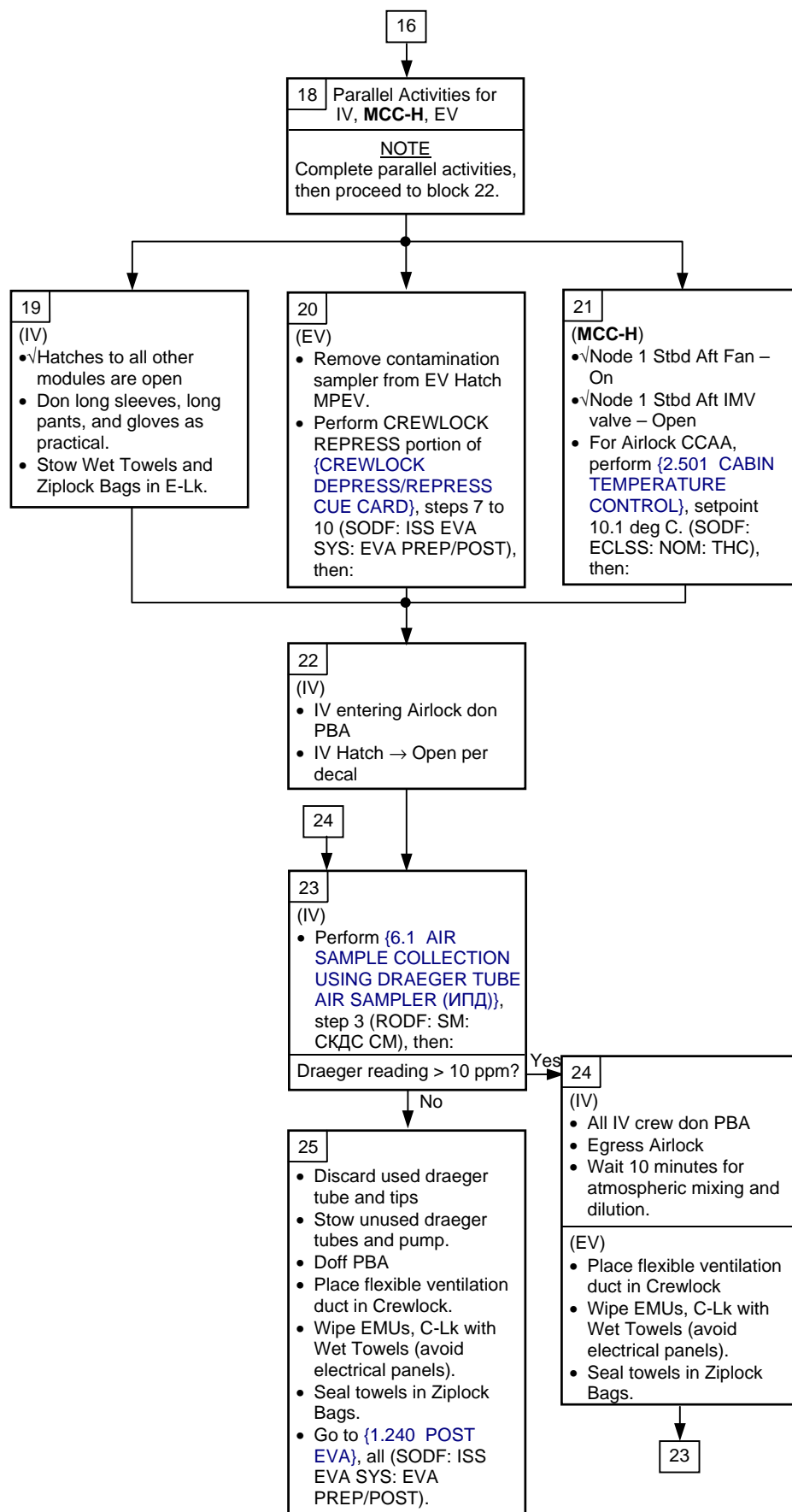
(2)
For confirmed contamination 2:00 (2:15 if from ISS thruster) of EMU consumables must be available to support activities from ingress through EMU doffing. For suspected contamination 0:55 (1:10 if from ISS thruster) of consumables required. EVA tasks must be deferred to protect these consumables. Bakeout on SCU does not consume Metox/LiOH if Helmet Purge valve is open.

(4)
Crew should remain in Crewlock throughout Airlock Bakeout. However, if temporary egress is required, SCU strain relief hook must be connected to EMU D-Ring.

4.140 ISS EVA DECONTAMINATION

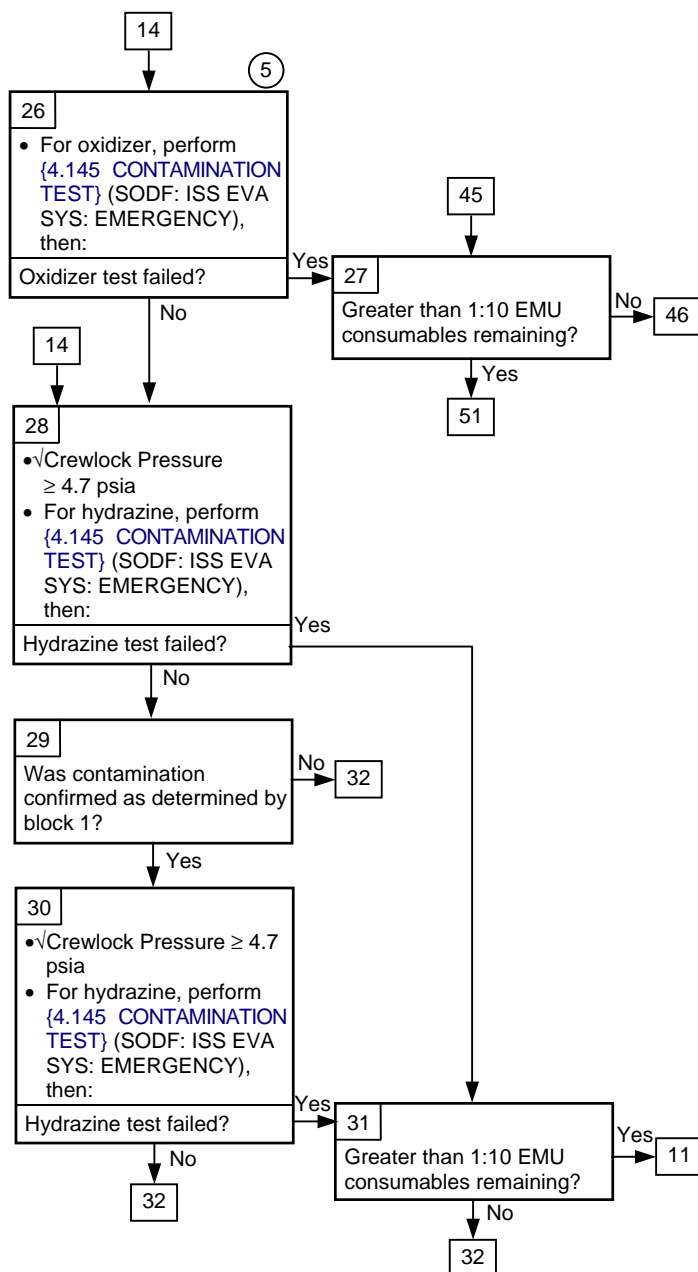
(ISS EVA SYS/7A - ALL/FIN 2/HC/Paper on ISS) Page 3 of 9 pages





4.140 ISS EVA DECONTAMINATION

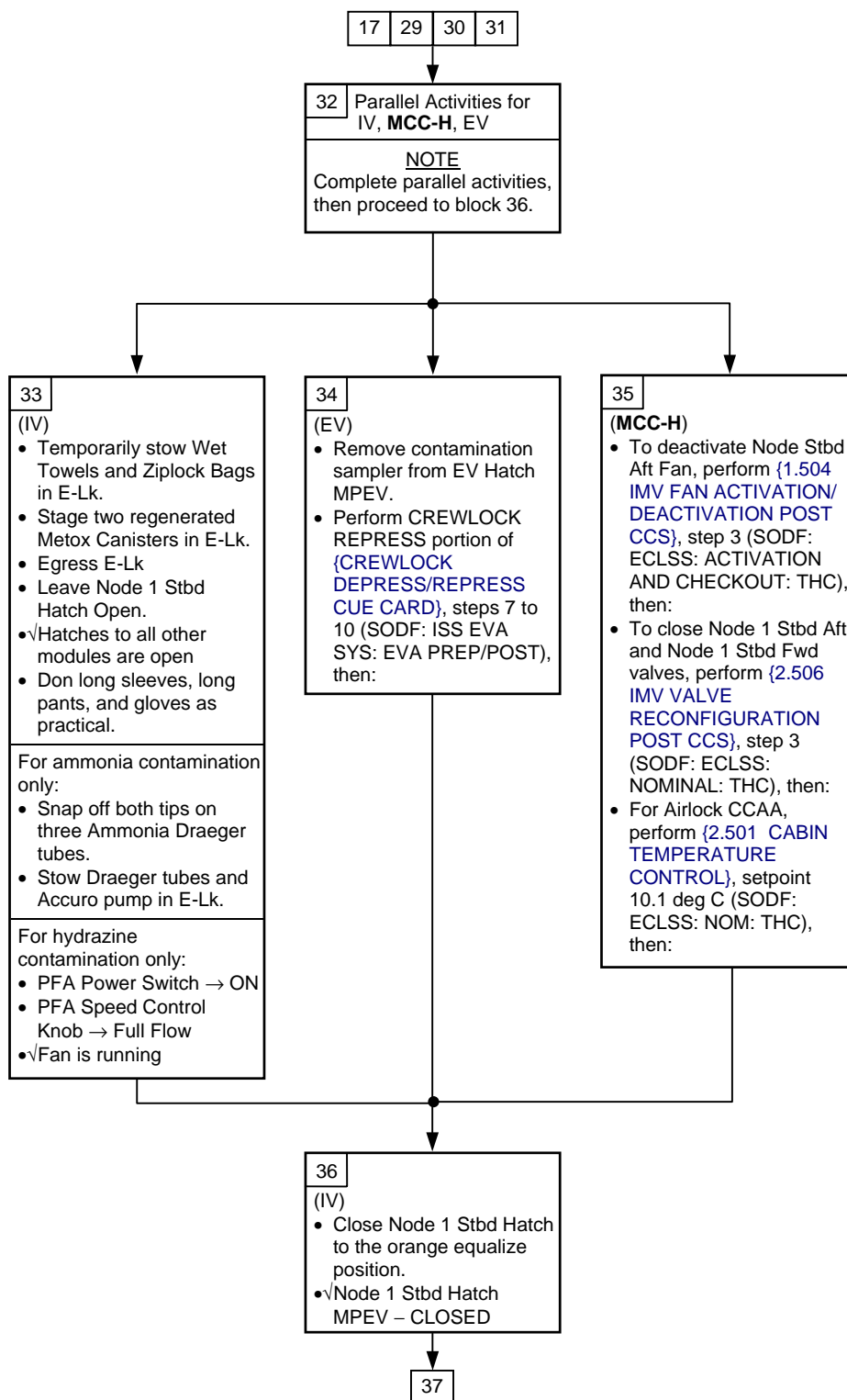
(ISS EVA SYS/7A - ALL/FIN 2/HC/Paper on ISS) Page 5 of 9 pages

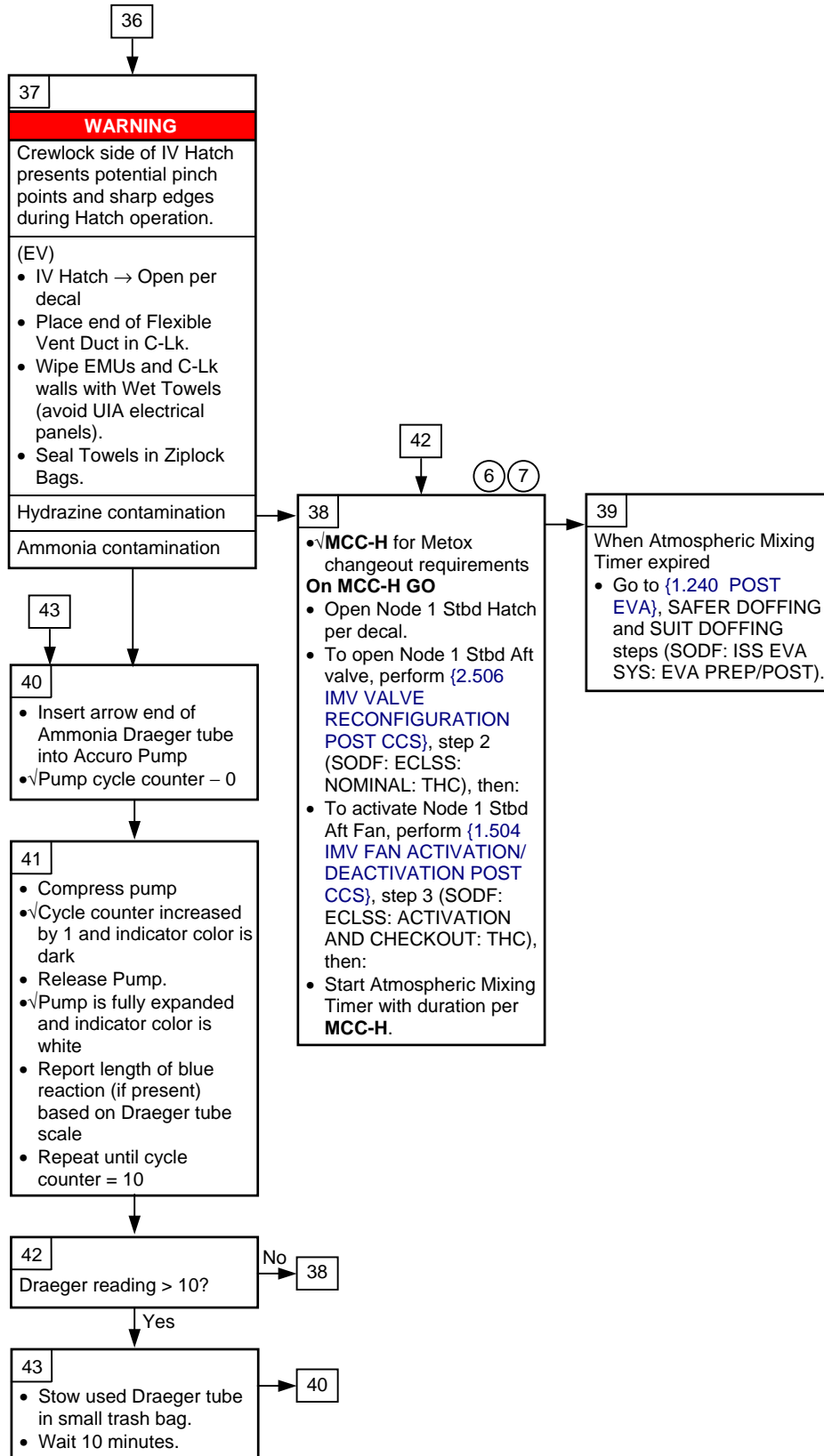


⑤
On ISS, it is impossible to determine if a propulsion leak was fuel or oxidizer. Therefore tests must be performed for both oxidizer and UDMH.

4.140 ISS EVA DECONTAMINATION

(ISS EVA SYS/7A - ALL/FIN 2/HC/Paper on ISS) Page 6 of 9 pages



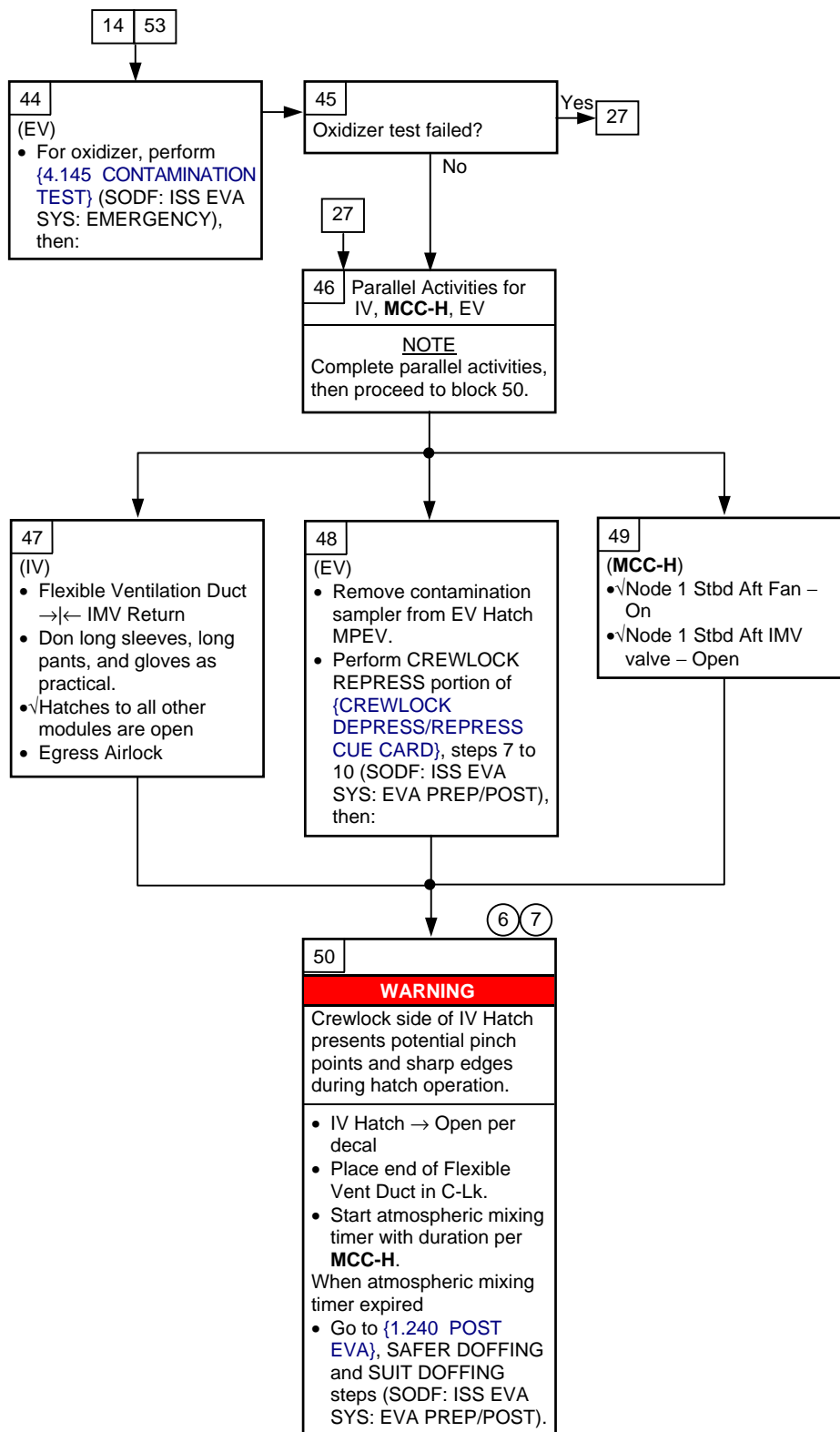


⑥ Atmospheric mixing will dilute Airlock atmosphere by 50 % every 6 minutes. Mixing will be 99 % complete after 42 minutes. Maximum dilution is approximately 14:1 with shuttle present and 12:1 without shuttle. Minimum mixing time assuming Contamination Test passed at 5 psi is 5 minutes for MMH and 10 minutes for UDMH.

⑦ IV crewmembers must remain outside of Airlock during atmospheric mixing time to avoid localized regions of elevated concentration. If IV must enter Airlock before mixing complete to assist EV crew, don PBA.

4.140 ISS EVA DECONTAMINATION

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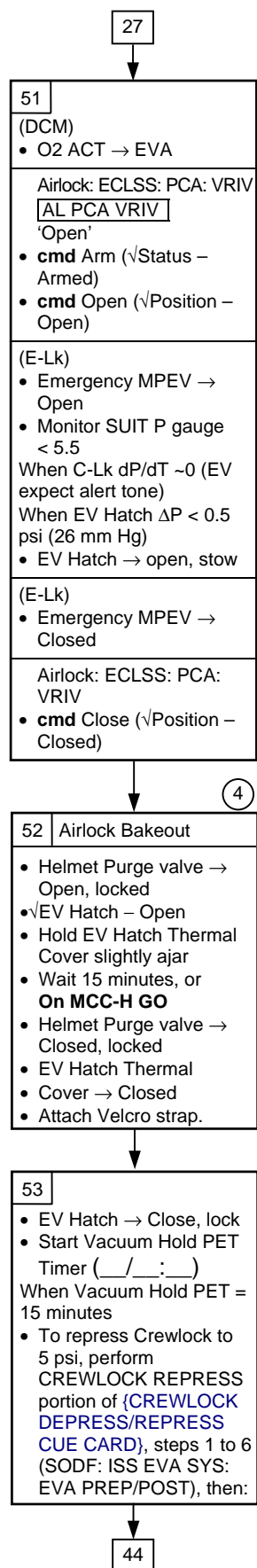


⑥
Atmospheric mixing
will dilute Airlock
atmosphere by 50 %
every 6 minutes.
Mixing will be 99 %
complete after 42
minutes. Maximum
dilution is
approximately 14:1
with shuttle present
and 12:1 without
shuttle. Minimum
mixing time
assuming
Contamination Test
passed at 5 psi is
5 minutes for MMH
and 10 minutes for
UDMH.

⑦
IV crewmembers
must remain outside
of Airlock during
atmospheric mixing
time to avoid
localized regions
of elevated
concentration. If IV
must enter Airlock
before mixing
complete to assist
EV crew, don PBA.

4.140 ISS EVA DECONTAMINATION

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④

Crew should remain in Crewlock throughout Airlock Bakeout. However, if temporary egress is required, SCU strain relief hook must be connected to EMU D-Ring.

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4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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(100 Minutes without second repress attempt)

OBJECTIVE:

Given a large Crewlock leak that cannot be supported during Crewlock repress, this procedure depresses the Equipment Lock to vacuum for EV crew ingress and repress.

DEPRESSING CREWLOCK (20 MINUTES)

EV DCM 1. $\sqrt{\text{sw}}$ Comm FREQ – LOW

sw COMM mode → PRI

NOTE

Steps 21 to 24 should be performed in parallel as quickly as possible to save EV crew consumables.

If more than one IV crewmember available

IV2 2. Perform steps 21 to 24 immediately, then assist IV1 as available.

IV C-Lk 3. $\sqrt{\text{IV}}$ Hatch equalization valve – OFF

EV DCM 4. O2 ACT → EVA

IV PCS 5. Airlock: ECLSS: PCA: VRIV

AL PCA VRIV

'Open'

cmd Arm ($\sqrt{\text{Status}}$ – Armed)

cmd Open ($\sqrt{\text{Position}}$ – Open)

IV 6. Emergency MPEV → OPEN (EV expect alert tone)
EV Monitor SUIT P gauge < 5.5.

* If gauge > 5.5, stop depress, $\sqrt{\text{MCC-H}}$.

If EV Hatch MPEV is usable per **MCC-H**

EV C-Lk 7. EV Hatch MPEV → OPEN

8. Attach waist tethers to C-Lk (UIA) D-ring.

9. When C-Lk dP/dT ~ 0, (EV expect alert tone)

When EV Hatch ΔP < 26 mmHg (0.5 psi)

10. EV Hatch → open, stow

11. EV Hatch MPEV → CLOSED

12. Inspect EV Hatch seals for damage and debris.
Remove debris as required.

4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

Page 2 of 6 pages

IV 13. Emergency MPEV → CLOSED

PCS 14. Airlock: ECLSS: PCA: VRIV
AL PCA VRIV
 'Close'

cmd Close (√Position – Closed)

15. √**MCC-H** for EMU consumables

If second repress attempt desired and > 90 minutes of EMU consumables

EV 16. √Thermal cover – closed

17. EV Hatch → close and lock

18. Go to CREWLOCK REPRESS {CREWLOCK DEPRESS/REPRESS CUE CARD} (SODF: ISS EVA SYS: EVA PREP/POST) steps 3 to 11.

If < 80 minutes of EMU Metox (LiOH) remain

EV 19. Helmet Purge vlv → open

PREPARING EQUIPMENT LOCK FOR VACUUM (20 MINUTES)

MCC-H/IV	IV	EV
PCS: 20. Perform {4.152 EQUIPMENT LOCK CONFIG FOR VACUUM}, steps 1 to 12. (SODF: ISS EVA SYS: EMERGENCY), then:	Metx. 21. √sw POWER – OFF Regen. √ON LED – Off BCA 22. √sw MAIN POWER (four) – OFF √LEDs (four) – Off EACP 23. √sw PWR – OFF 24. Remove from E-lk: All bags All laptops (PCS, SSC) spare EMU(s) All PHAs All PBAs PFE EMU Equip Bag EMU Serv Kit All floor bin-stowed items 25. Egress E-Lk 26. Close Node1 Stbd Hatch per decal. 27. √Node 1 Stbd Hatch MPEV – CLOSED and uncapped	C-Lk 28. Begin removing every other Velcro strap from SCU. C-Lk IVA Bag: 29. Retrieve EVA Ratchet and 7/16" X 6" wobble socket 30. Cold soak as time allows. Temp control vlv → increase toward Max C (slightly colder than comfortable)

4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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EQUIPMENT LOCK DEPRESS (15 MINUTES)

MCC-H, IV

31. Give a go for Equipment Lock depress.

EV C-Lk

32. ✓EV Hatch – Open and stowed

33. IV Hatch equalization valve → EMER

WARNING

Hatch latch mechanism is a pinch hazard.
Verify EV crew is clear of it.

MCC-H/IV

PCS

34. Airlock: ECLSS:
'Equipment Lock'
Monitor 'Cab Press'

When 'Cab Press' ~ 0 mmHg (10 to 15 minutes)

EV C-Lk

35. Open IV Hatch per decal.

36. IV Hatch equalization valve → OFF

37. EV Hatch Thermal Cover → Close

38. Partially close EV Hatch. Leave small gap for water sublimation.

39. Waist Tethers ←|→ C-Lk D-ring; attach to EMUs

CONFIGURING FOR SCU REMOVAL (5 MINUTES)

40. Transfer the following to Equipment Lock and secure:

IV Bag
Staging Bag
Crewlock EVA Bags (four)
All ORUs

If Helmet Purge vlv – open (per step 19, to conserve Metox/LiOH)

41. Helmet Purge vlv → close and lock

DCM

42. ✓STATUS: O2 P > 850

WARNING

EV crew will be without SCU O2 supply for approximately 40 minutes. If Metox (LiOH) canister expended, open/close helmet purge valve as required to maintain safe ppCO2 levels. The SOP may be required to complete the procedure.

MCC-H/

IV PCS

43. CLOSING AIRLOCK O2 HI PRESSURE SUPPLY VALVE

Airlock: ECLSS: O2 Hi Pressure Supply Vlv

AL O2 Hi Pressure Supply Valve

cmd Close (Verify Actual Position – Closed)

4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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- EV DCM 44. sw POWER → BATT, (expect warning tone)
- UIA 45. sw PWR EV-1,2 (two) → OFF
- √PWR EV-1,2 LEDs (four) – Off
- DCM 46. SCU ←|→ DCM
Install DCM cover.
- C-lk 47. Stow SCU in pouch.
- DCM 48. Temp control vlv → Max H
49. sw WATER → ON
- √DCM display – blank, BITE – off
50. Temp control vlv → 3 to Max C (slightly colder than comfortable)

MCC-H/IV
PCS

51. DISABLING THE POWER SUPPLY ASSEMBLY

Airlock: EPS: RPCM AL2A3B B

sel RPC 18

RPCM AL2A3B B RPC 18

cmd Open Cmd – Enable (√Open Cmd – Ena)

cmd RPC Position – Op (√RPC Position – Op)

MCC-H

52. Give EV crew a go for SCU Removal.

REMOVING SCU FROM UIA (20 MINUTES)

MCC-H/IV	EV
53. Perform {4.152 EQUIPMENT LOCK CONFIG FOR VACUUM}, step 13 (SODF: ISS EVA SYS: EMERGENCY), then:	<div>CAUTION ОРЛАН caps on UIA are not tethered. Be prepared to catch them during removal.</div> <p>54. Perform {SCU REMOVAL FROM UIA (AT VACUUM)}, pages 32 and 33 (SODF: ISS EVA SYS: CUFF CHECKLIST), then:</p>

EQUIPMENT LOCK INGRESS (5 MINUTES)

DCM

55. Begin maximum cold soak.
Temp control vlv → Max C

4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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56. Transfer SCUs to E-Lk and secure

57. ✓ All items removed from C-Lk

NOTE

EV crew will be without cooling after the next step.

58. sw WATER → OFF

59. EV Hatch → fully close, lock

✓ EV Hatch MPEV – CLOSED

60. Ingress E-Lk.

✓ IV Hatch clear of debris.

EV

61. Close IV Hatch per decal, lock.

✓ IV Hatch equalization valve – OFF

EQUIPMENT LOCK REPRESS (15 MINUTES)

NOTE

EV crew disregard **SET O2 PRESS** message during repress.

MCC-H

62. Give a go for Equipment Lock Repress

EV/IV

63. Node 1 Stbd Hatch MPEV → throttle CLOSED to OPEN (as required), EV expect alert tone

EV DCM

64. E-Lk at 4.0, EV expect alert tone.

WARNING

1. If Cuff 1 symptoms resolving upon repress, report as Cuff 2.
2. If any DCS, O2 ACT → PRESS instead of IV in the next step.

DCM

When AIRLK P > 5.0 psia

65. O2 ACT → IV

WARNING

Verify EV crew is clear of hatch latch mechanism.

When E-Lk dP/dT ~ 0 (EV expect alert tone)

66. Open Node 1 Stbd Hatch per decal.

4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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67. √Node 1 Stbd Hatch MPEV – CLOSED

IV

68. Install IV Hatch equalization valve cap.

MCC-H	IV and EV
69. Go to {4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE} (SODF: ISS EVA SYS: EMERGENCY).	70. Perform {4.115 EXPEDITED SUIT DOFFING}, all (SODF: ISS EVA SYS: EMERGENCY), then: √MCC-H for deltas

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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I

(20 minutes)

OBJECTIVE:

Command ISS hardware to a configuration safe for Equipment Lock Depress and Repress.

NOTE

This procedure should normally be performed by **MCC-H**.

MCC-H/IV

PCS

1. Rapid Depress: ISS IMV Isolation

ISS IMV Isolation

'Airlock IMV Isolation'

cmd Arm (√Arm Status – Armed)

cmd Isolate

√Status – Isolated

2. Node 1: ECLSS: IMV Stbd Aft Vlv

Node 1 IMV Stbd Aft Valve

'Inhibit'

cmd Arm (√Arm Status – Armed)

cmd Inhibit (√State – Inhibited)

sel RPCM N14B C RPC 13

cmd RPC Position – Open (Verify – Op)

3. Node 1: ECLSS: IMV Stbd Fwd Vlv

Node 1 IMV Stbd Fwd Valve

'Inhibit'

cmd Arm (√Arm Status – Armed)

cmd Inhibit (√State – Inhibited)

sel RPCM N14B A RPC 16

cmd RPC Position – Open (Verify – Op)

4. US Lab: ECLSS: AR Rack

LAB AR Rack Overview

'CDRA'

If CDRA State – Operate

'Stop'

NOTE

Per SPN 1903 (5A-AC), the Disarm command should be sent after the Stop command because it does not automatically disarm itself.

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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┌
└ **cmd** Arm (√Status – Armed)
 cmd Stop
 cmd Disarm (√Status – Disarmed)
└
 √CDRA Status – Stop Complete

PCS

5. US Lab: TCS

LAB:IATCS Overview

'Status'

If Mode – Sngl LT or Sngl MT
Go to step 6.

US Lab: TCS: IATCS Details: LAB Act TCS RPC Commands

LAB Act TCS RPC Commands

Verify positions of all RPCs (17) – CI

US Lab: TCS: IATCS Details

IATCS Details

Verify LTL PPA RT Status – Ena

Verify MTL PPA RT Status – Ena

US Lab: TCS: Software

Software Commands

'IATCS'

'Mode'

cmd Sngl LT – Arm (√Arm Status – Sngl LT Armed)

cmd Sngl LT – Sngl LT

Expect Caution message '**Lab LTL SFCA Uncontrolled DP - LAB**'

Expect Caution message '**Lab MTL SFCA Uncontrolled DP - LAB**'

NOTE

Multiple LAB1XX Rack Temp and Flow
Cautions can be expected.

Wait up to 3 minutes.

US Lab: TCS

Lab:IATCS Overview

'Status'

'IATCS'

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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Verify Status – Oper
Verify Mode – Sngl LT

NOTE

Lowering the LTL SFCA Mod Vlv dP prior to commanding LCA Vlv 2 to Dual is necessary due to the expected large pressure transient. At the nominal setpoint, the pressure spike may trigger the SFCA Overpress FDIR, resulting in auto reduction of LTL Pump Speed.

US Lab: TCS: LTL SFCA

LTL SFCA Commands

'LTL SFCA'

'Mod Vlv dP Setpt'

input New Setpoint – 20.7 kPa

cmd Set – Set (√Mod Vlv dP Setpt: 20.7 kPa)

US Lab: TCS

Lab: IATCS Overview

'SFCA'

√LTL Mod Vlv dP: 20.7 ± 7 kPa

Configuring LCA Valve 2 to Dual Position

US Lab: TCS: LCA Icon

LCA Commands

'LCA'

√Vlv1 Posn – Sngl

If Vlv2 Posn – Sngl then

cmd Vlv2 Posn – Dual **Execute**

 √Vlv2 Posn – Dual

US Lab: TCS: LTL SFCA

LTL SFCA Commands

'LTL SFCA'

'Mod Vlv dP Setpt'

input New Setpoint – 75.8 kPa

cmd Set – Set (√Mod Vlv dP Setpt: 75.8 kPa)

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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NOTE

LT Setpoint is raised to prevent localized freezing of water on the AL CCAA HX surfaces. While the LT setpoint is elevated, LAB CCAAs are not providing any latent cooling.

PCS

6. RAISING LT SETPOINT

P6: TCS: Loop A(B) Details: PPL Ver ID

PPL_Ver_ID

'P6 PVCA EETCS'

'Setpt PPL Ver ID'

√Prime: 106

√Bkup: 106

If Ver ID ≠ 106, √**MCC-H**

P6: TCS: Loop A(B) Line Heater Icon

Loop A(B) Line Heater Commands

'EETCS LoopA(B) PFCS'

√Line Htr Cntl – Ena

If Line Htr Cntl – Inh

√Inhibited Line Htr ≠ Both

Repeat step for both EETCS Loop A and Loop B.

LAB: TCS: LTLTWMV Icon

LTL TWMV Commands

'LTL TWMV'

'Temp Setpt'

input – 2 1

cmd Set Execute

√Temp Setpt – 21.0° C

If after several minutes, LTL TWMV Out Temp < 21.0° C

Raise the MTL TWMV Temp Setpoint to increase temperature of water entering LT IFHX.

LAB: TCS: MTL TWMV Icon

MTL TWMV Commands

'MTL TWMV'

'Temp Setpt'

input – 1 5

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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cmd Set Execute

√Temp Setpt – 15.0° C

cmd CLC – Ena (Verify – Ena)

Raise MTL TWMV Temp Setpoint in 2-degree increments as required until LTL TWMV Out Temp $-21.0 \pm 0.6^{\circ} \text{C}$.

7. Fire Summ: Airlock

AL Fire Display

'Fire Isolation'

'Cabin Air Assembly'

cmd Stop (√State – EIB Off)

sel AL CCAA

AL CCAA: CCAA Commands

AL CCAA Commands

sel RPCM AL2A3B B RPC [X] where [X] = **3** **5** **6** **17**

cmd RPC Position – Open (√ – Op)

Repeat

8. Fire Summ: Airlock

AL Fire Display

'Airlock Smoke Detectors'

sel Cabin

AL Cabin Smoke Detector

'Monitoring'

cmd Inhibit (√Status – Inhibited)

sel RPCM AL2A3B A RPC 08

RPCM AL2A3B A RPC 08

cmd RPC Position – Open (Verify – Op)

AL Fire Display

'Airlock Smoke Detectors'

sel Duct

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

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AL Duct Smoke Detector

'Monitoring'

cmd Inhibit (√Status – Inhibited)

sel RPCM AL2A3B B RPC 07

RPCM AL2A3B B RPC 07

cmd RPC Position – Open (Verify – Op)

MCC-H

9. Configuring MCA for Sampling LAB/NODE

AL Fire Display

'LAB MCA'

√State – Operate

If State not Operate
Go to step 10.

sel LAB MCA

LAB MCA

sel Nominal Cmds

LAB MCA Nominal Commands

NOTE

Per SPN 3572 (5A - x2 INTR3), the MCA can get out of sync with the INT SYS after an autosequence command. To prevent this, a Standby Immediate command should be issued first.

'Standby'

cmd Immediate

√State – Standby

'Auto Sequencing'

cmd LAB/Node1

√State – Operate

LAB MCA

sel Additional TIm

LAB MCA Additional TIm

√Invalid Sequence – blank

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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10. C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Inhibit

Inhibit an Event

input Event Code – 6 3 6 8 (Cabin Pressure Low-E/L)

cmd Arm

cmd Execute

input Event Code – 6 5 7 6 (Rapid Depress-A/L)

cmd Arm

cmd Execute

input Event Code – 6 3 5 6 (Cabin Pressure Above Normal-E/L)

cmd Arm

cmd Execute

input Event Code – 5 9 1 0 (Cabin Pressure Below Normal-E/L)

cmd Arm

cmd Execute

11. Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'Airlock Depress Response – INT MDM'

'Inhibit'

cmd Inhibit – Arm ($\sqrt{\text{Status – Armed}}$)

cmd Inhibit ($\sqrt{\text{Status – Inhibited}}$)

'CC MDM Rapid Depress Response'

'Inhibit'

cmd Arm ($\sqrt{\text{Status – Armed}}$)

cmd Inhibit ($\sqrt{\text{Status – Inhibited}}$)

12. DEACTIVATING AIRLOCK ATUS, CVIU, AND UOP

Airlock: EPS: RPCM AL2A3B A

sel RPC [X] where [X] = 1 3 14 17

cmd RPC Position – Open ($\sqrt{\text{– Op}}$)

Repeat

4.152 EQUIPMENT LOCK CONFIG FOR VACUUM

(ISS EVA SYS/7A - ALL/FIN 4/Paper on ISS)

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Airlock: EPS: RPCM AL2A3B B: RPC 01

RPCM AL2A3B B RPC 01

'RPC Position'

cmd RPC Position – Open (√ – Op)

Prior to Equipment Lock Repress

13. INHIBITING ISS RAPID DEPRESS RESPONSE AND C&W

MCC-H/IV
PCS

13.1 Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'INT MDM Rapid Depress Response'

'Inhibit'

cmd Inhibit Arm (√Status– Armed)

cmd Inhibit (√Status – Inhibited)

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Inhibit

Inhibit an Event

input Event Code – 6 5 7 5 (Rapid Depress – LAB)

cmd Arm

cmd Execute

13.2 Inhibiting CCS Low Pressure Safing Response

Rapid Depress: Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'CC MDM Low Cabin P Response'

'Inhibit'

cmd Arm (√Status – Armed)

cmd Inhibit (√Status – Inhibited)

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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OBJECTIVE:

Reconfigure ISS systems back to normal following execution of procedure

{4.150 CREWLOCK LARGE LEAK RESPONSE AT 5 PSIA} (SODF: ISS EVA SYS: EMERGENCY). This procedure is nominally performed by **MCC-H**.

MCC-H/IV
PCS

1. RECONFIGURING IATCS

1.1 US Lab: TCS: LTL TWMV Icon

LTL TWMV Commands

'Commands'

'LTL TWMV'

cmd CLC – Ena **Execute** ($\sqrt{\text{CLC} - \text{Ena}}$)

NOTE

If LTL or MTL TWMV setpoints were previously changed in response to Crewlock leak, then setpoints must be reset to the original values.

- 1.2 For LTL TWMV and MTL TWMV as necessary, perform {2.201 LAB IATCS SETPOINT CHANGE}, all (SODF: TCS: NOMINAL: IATCS), then:

PCS

2. ENABLING RAPID DEPRESS RESPONSE

Rapid Depress

ISS Depress

'LAB'

Wait until $|dP/dT| < 0.04$ mmHg/min.

2.1 Enabling Rapid Depress Response

sel Rapid Depress Response Software Control

US Rapid Depress Response Software Control

'Airlock Depress Response – INT MDM'

'Enable'

cmd Enable ($\sqrt{\text{Status} - \text{Enabled}}$)

'INT MDM Rapid Depress Response'

'Enable'

cmd Enable ($\sqrt{\text{Status} - \text{Enabled}}$)

'CC MDM Rapid Depress Response'

'Enable'

cmd Enable ($\sqrt{\text{Status} - \text{Enabled}}$)

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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2.2 Enabling CCS Low Pressure Safing Response

'CC MDM Low Cabin P Response'

'Enable'

cmd Enable (√Status – Enabled)

3. ENABLING ALARMS

C&W Summ

Caution & Warning Summary

'Event Code Tools'

sel Enable

Enable an Event

input Event Code: [X] where [X] =

6368 Cabin Pressure Low-E/L

5910 Cabin Pressure Below Normal-E/L

6356 Cabin Pressure Above Normal-E/L

6576 RAPID DEPRESS-A/L

6575 RAPID DEPRESS-LAB

cmd Execute

Repeat

4. ACTIVATING AIRLOCK ATUS, CVIU, AND UOP

Airlock: EPS: RPCM AL2A3B A

RPCM AL2A3B A

sel RPC [X] where [X] = 1 3 14 17

RPCM AL2A3B A RPC [X]

cmd RPC Position – Close (Verify – CI)

Repeat

Perform {2.213 AUDIO SUBSYSTEM CONFIGURATION FOR UHF OPS}, steps 9 to 12 (SODF: C&T: NOMINAL: AUDIO), then:

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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5. RELEASING IMV ISOLATION

Rapid Depress: Isolation Status

'Airlock IMV Isolation'

cmd Release (√Airlock IMV Isolation Status – Released)

6. ACTIVATING AIRLOCK SMOKE DETECTORS

6.1 Fire Summ: Airlock

'Airlock Smoke Detectors'

sel Cabin

sel RPCM AL2A3B A RPC 08

cmd RPC Position – Close (Verify – CI)

Verify Obscuration, % Contamination < 25.

Verify Scatter, % Obscuration per Meter < 1.

'Monitoring'

cmd Enable (√Status – Enabled)

Wait 5 seconds.

'Active BIT'

√Failure – blank

'Passive BIT'

√Lens Status – Clean

√Failure – blank

6.2 Fire Summ: Airlock

'Airlock Smoke Detectors'

sel Duct

sel RPCM AL2A3B B RPC 07

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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cmd RPC Position – Close (Verify – CI)

AL Duct Smoke Detector

Verify Obscuration, % Contamination < 25.

Verify Scatter, % Obscuration per Meter < 1.

‘Monitoring’

cmd Enable (√Status – Enabled)

Wait 5 seconds.

‘Active BIT’

√Failure – blank

‘Passive BIT’

√Lens Status – Clean

√Failure – blank

7. REESTABLISHING INTERMODULE VENTILATION

7.1 Node 1: ECLSS: IMV Stbd Aft Valve

Node 1 IMV Stbd Aft Vlv

sel RPCM N14B C RPC 13

cmd RPC Postion – Close (Verify – CI)

‘Enable’

cmd Arm (√Arm State – Armed)

cmd Enable (√State – Enabled)

‘Open’

cmd Arm (√Arm Status – Armed)

cmd Open

√Position – In Transit

Wait 25 seconds.

√Position – Open

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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7.2 Node 1: ECLSS: IMV Stbd Aft Fan

Node 1 IMV Stbd Aft Fan

'On'

cmd On

√State – In Transit

Wait 15 seconds.

√State – On

√Speed: 7745 to 9278 rpm

7.3 Node 1: ECLSS: IMV Stbd Fwd Valve

Node 1 IMV Stbd Fwd Vlv

sel RPCM N14B A RPC 16

cmd RPC Position – Close (Verify – CI)

Node 1 IMV Stbd Fwd Vlv

'Enable'

cmd Arm (√Arm Status – Armed)

cmd Enable (√State – Enabled)

8. [ACTIVATING AIRLOCK CCAA](#)

To activate Airlock CCAA, perform {[1.509 AIRLOCK CCAA ACTIVATION](#)}, steps 3 to 9 (SODF: ECLSS: ACTIVATION AND CHECKOUT: THC), then:

9. [RECONFIGURING MCA AUTOSEQUENCE LIST](#)

NOTE

The nominal autosequence list will include Node, Airlock, and Lab modules when MPLM is not available.

4.155 RECONFIGURATION FOLLOWING CREWLOCK LARGE LEAK RESPONSE

(ISS EVA SYS/8A - ALL/FIN 3)

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If desired autosequence list is LAB/Node1/Airlock, LAB/Node1, or LAB/Node1/Airlock/MPLM

NOTE

Per SPN 3572 (5A - x2 INTR3), the MCA can get out of sync with the INT SYS after an autosequence command. To prevent this, a Standby Immediate command should be issued first.

US Lab: ECLSS: AR Rack

LAB AR Rack Overview

'Standby Immediate'

cmd Standby Immediate

√State – Standby

'MCA'

'Auto Sequence'

cmd LAB/Node1/Airlock (LAB/Node1)
(LAB/Node1/Airlock/MPLM)

√State – Operate

US Lab: ECLSS: AR Rack: MCA: Additional TIm

LAB MCA Additional TIm

√Invalid Sequence – blank

If another autosequence list is desired, perform {2.301 MCA
AUTO SEQUENCE LIST CHANGE}, all (SODF: ECLSS:
NOMINAL: ARS), then:

10. ACTIVATING CDRA

If required, to activate CDRA, go to {1.301 ATMOSPHERE
REVITALIZATION RACK ACTIVATION}, step 10 (SODF:
ECLSS: ACTIVATION AND CHECKOUT: ARS).